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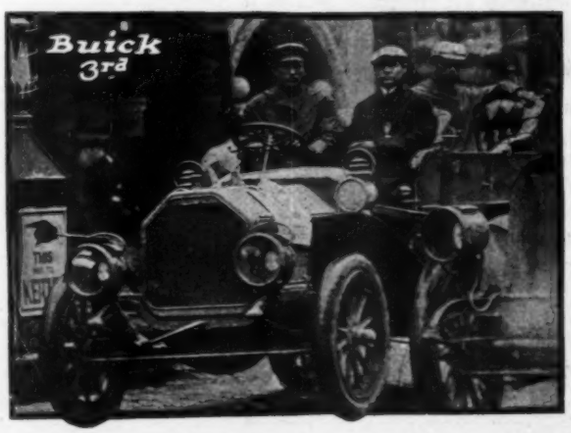
THE AUTOMOBILE

One Clean Score Survivor: Gaeth in Cleveland Sealed Bonnet Efficiency Test

By W. F. Bradley

CLEVELAND, O., Sept. 13.—A four-cylinder Gaeth, driven by its owner, Paul Gaeth, was the only contestant which survived with a perfect score the stringent three-days' sealed bonnet contest organized by the Cleveland Automobile Club. J. W. David, piloting a Mora, secured second position with only twenty-five points penalization, incurred through an accidental stalling of the engine when a broken chain blocked the rear wheel. A four-cylinder Buick, but a few hours out of the factory when H. J. Trumball took charge of it, finished third with forty points against it for taking water on two occasions. All three machines completed the run with their seals intact, the Gaeth in addition having the honor of never stopping its motor except when authorized to do so in control. Had not the Buick run out of gasoline two miles from home, its engine would never have stopped on the run. Less fortunate were the two Cartercars, driven by B. J. Carter, and A. W. Hall, with 549 points and 771 points penalization; the two-cylinder Buick, with a broken driving chain, and two Jacksons, which retired on the first day.



The three utility tests planned by the Cleveland Club failed to draw the support they deserved. No maker of electric vehicles thought it worth while to submit his product to the ordeal outlined by the contest committee. But two commercial vehicles entered the strenuous ranks, and one of these combined the competitive test with its work-a-day duties.

Eight pleasure vehicles responded to the invitation to run over Ohio mud roads for three days with seals on everything sealable and a rival observed to record the good and the bad. Cleveland automobile manufacturers, with a reputation extending far beyond the city limits, were unanimous in declaring that the wrong date had been chosen for the test; some were of opinion that local club events should be abandoned in favor of bigger national competitions, and a few criticised the conditions.

Certainly the rules did not err on the side of leniency; in their endeavor to provide a more comprehensive test than is usual in reliability runs, the committee sacrificed itself unreservedly and would probably have found its self-imposed task too great to keep out criticism but for the ungrudging executive work performed by Chairman George H. Bowler, Walter C. Baker and L. S. Buschman. The seals on the bonnet and coil box could only be broken at a cost of 50 points penalization; 5 points a minute was the price for repairs or adjustments; each involuntary stop of the motor added 25 points to the blacklist, and water could only be had at the rate of 5 points per minute for time spent pouring it in.

For the second day's run of 156 miles to Warren, Ashtabula, and return, the four-cylinder Buick and the Gaeth started out with a clean record, while the Mora, the two-cylinder Buick, and the two Cartercars had against them the varying penalizations of the first day. After the brick pavement of suburban Cleveland, heavy going was experienced to Chagrin Falls. Onward to Warren, conditions were a little better; but the latter part, from Warren to Ashtabula and home to Cleveland, was punctuated with heavy showers and was over surfaces unworthy to be called

MESSRS. BOWLER, BUSCHMAN AND BAKER WERE A BUSY TRIO.

roads. The Gaeth, the Mora and the two Buicks, however, came through with flying colors, reporting to headquarters on time and without a black mark laid up against them on the observers' cards. Both Cartercars fell during the day, No. 22 being obliged to break the seals to change a cracked spark plug and No. 21 having to renew the water supply after the engine had been stalled.

Along the banks of Lake Erie to Sandusky, on the morning of the third day, was one of the pleasantest rides west of Cleveland. Road conditions having improved, all six machines bowled along at a merry pace in full hopes of terminating without a blemish. Near Monroeville misfortune befell the party. On taking a turn a front tire of the White steamer confetti car came off the rim, rendering the automobile unmanageable. Bert Adams, who was at the wheel, did his best to get the car round the turn, and was assisted by Mertin A. Phillips, who instantly realized the danger on hearing the report, but it was in vain. The car crashed into a telegraph post, cut it down, swung with its rear against a tree and collapsed. One of the rear springs broke under the blow, pierced the gasoline tank and caused an explosion. The two men in front jumped for safety, but did not altogether escape the flames. Fred Baird and J. Lee Cross were enveloped in fire before they could even make an effort to escape from the tonneau, and suffered very severe burns about the head, hands and feet. In addition J. Lee Cross had his shoulder dislocated by the telegraph pole as it fell across the car.

Difficulties Followed Accident.

As they came along, all contestants were held up and only started out again when the injured men had received medical attention and been put on the train for Cleveland. The unfortunate occurrence, however, disorganized the run. W. W. Partridge's Stearns, the official car which arrived first on the scene, was given the confetti and sent ahead. Carbureter troubles came along and the lead had to be transferred to a man unfamiliar with the road. Instead of running to Oberlin, as laid down on the route, a straight course was laid for Elyria through some small town torn up from end to end by a street railroad constructor. Nine miles were saved, but the going was of such an acrobatic nature that all were heavily handicapped.

The four-cylinder Buick, for instance, had been running for a couple of hours with a broken front spring without any apparent inconvenience, but was subjected to an unreasonable strain when called upon to plough through torn up streets, run over building plots, and scramble over half-laid railroad tracks. The engine never stopped, the seals were intact, but water had to be added twice and the first penalization was incurred.

Paul Gaeth's four-cylinder Gaeth ploughed across country valiantly, running on three cylinders for the last few miles, but still reaching control on time, with seals unbroken and without any additions to its cooling water. Its reward was the only perfect score earned in the contest.

J. W. David's Mora, a veteran of the Chicago and New York sealed bonnet contests, went through a series of road accidents during the last few miles. Notwithstanding the engine never stopped, the seals were untouched and control was reached on time. But for the accidental stalling of the engine on the first day the Mora would have tied with the Gaeth for honors.

The Cartercars both incurred penalizations through leaky pipes, causing the loss of water. Both, however, came in with the engine and transmission in excellent condition. Most unfortunate of all was the two-cylinder Buick. When climbing over a heap of dirt, with exposed car lines on one side and a ditch on the other, the single driving chain broke. No spare links being carried, a messenger had to be sent to Cleveland for the necessary repair material, the result being such a late arrival home that the day's penalization was never computed.

Commercial Vehicles Performed Faultlessly.

Each day the single-cylinder Gaeth delivery wagon and the four-cylinder truck manufactured by the American Motor Truck Company, of Lockport, N. Y., ran according to schedule through Cleveland and suburbs.

Daily Record of Penalizations.

Car	Driver	First Day	Second Day	Third Day	Total
Gaeth, 4-cylinder	Paul Gaeth	0	0	0	0
Mora, 4-cylinder	J. W. David	25	0	0	25
Buick, 4-cylinder	H. J. Trumball	0	0	40	40
Cartercar, 2-cylinder	B. J. Carter	120	135	255	549
Cartercar, 2-cylinder	A. W. Hall	562	134	75	771
Buick, 2-cylinder	Geo. Bettes	551	0 Broken chain		
Jackson, 2-cylinder	R. Burman	Tire trouble, abandoned			
Jackson, 4-cylinder	C. D. Paxon	Seized bearing, abandoned			

EFFICIENCY TABLE OF CLEVELAND'S SEALED BONNET CONTEST.

Make of car	Buick 2-cyl.	Cartercar 2-cyl.	Cartercar 2-cyl	Mora 4-cyl.	Buick 4-cyl.	Gaeth 4-cyl.
Weight (pounds)						
First day	2,633	2,695	2,910	3,108	3,070	3,885
Second day	2,600	2,845	2,857	3,105	3,270	3,889
Third day	2,695	2,785	2,998	3,105	3,435	4,150
Total gasoline (gallons)						
Miles, 138	12.00	11.30	14.30	11.00	12.00	15.70
Miles, 156	12.08	11.88	16.43	15.05	15.70	14.85
Miles, 147	12.10	10.60	14.70	12.50	12.10	25.00
Gasoline per ton (gallons)						
First day	9.26	8.40	9.85	7.09	7.82	8.06
Second day	9.30	8.34	11.51	9.86	9.63	7.66
Third day	9.00	7.61	9.82	8.05	7.05	12.05
Gasoline per ton-mile (gallons)						
First day	.0672	.0609	.0713	.0513	.0568	.0585
Second day	.0597	.0535	.0738	.0633	.0619	.0491
Third day	.0592	.0501	.0647	.052	.0464	.0794
Total water (gallons)						
First day	.37	3.50	.75	1.00	2.70	1.20
Second day	1.00	7.96	5.20	1.10	2.80	1.67
Third day	1.50	6.70	3.50	1.70	Used hose	7.30
Water per ton (gallons)						
First day	.284	2.60	.516	.644	1.76	.618
Second day	.77	Broken pipe	3.64	.723	1.71	.860
Third day	1.115	4.82	2.34	1.093	Used hose	3.51
Water per ton-mile (gallons)						
First day	.00206	.0188	.00374	.00467	0.127	.00477
Second day	.00494	....	.0234	.00463	.01098	.00552
Third day	.0734	.0317	.0153	.00706	Used hose	.0231
Total oil (gallons)						
First day	.692	.495	.475	.165	.896	.385
Second day	.766	.600	1.115	.211	.924	.428
Third day	.581	.556	1.463	.1054	.661	.303
Oil per ton (gallons)						
First day	.532	.367	.326	.106	.584	.198
Second day	.590	.422	.780	.138	.566	.221
Third day	.432	.407	.986	.0678	.386	.146
Oil per ton-mile (gallons)						
First day	.00386	.00266	.00236	.00076	.00423	.00143
Second day	.00378	.00270	.00500	.00088	.00364	.00142
Third day	.00284	.00268	.00643	.00043	.00254	.00096

Hartford's Successful Hill Climb a Battle Involving Pope-Hartford Stevens Duryea Corbin

By A. G. Batcheder

HARTFORD, CONN., Sept. 14.—The first annual hill-climb of the Automobile Club of Hartford supplied spirited contests and had only one accident, and that of a minor sort, despite the fact that the onlookers invaded the road whenever their curiosity got the better of them, which was frequent. Speed is the interesting factor nowadays, and this was made dangerously apparent when the thousands started home while the hill was still being used by the participants in the high-gear slow event. Previously in :56 2-5 the Pope-Hartford, with clever Grady at the wheel, had ascended the three-quarters of a mile climb, which had a maximum 16 per cent. grade until near the summit, when it became 21 per cent., and also possessed a sharp turn more than half way up. Here the two startling events of the day happened. Only one-fifth of a second less was the upward trip of the Stevens-Duryea "Little Six," "Pete" Robinson at the wheel. Corbett, one of the stars of the New York Motor Club 200-mile Albany endurance run, made the journey with a Corbin air cooler in :57. These three were the best climbers of the day, and it all happened in the free-for-all, which event demonstrated the unthinking attitude of the public, for these cars were stripped and denuded.

The man who tours, it would seem, would much prefer to note how good a regularly equipped stock car could make an ascent, rather than to enthuse over skyrocket performances.

There were two ties, one in the smaller runabout class and the other in the larger runabout division, but the desire of the spectators to get home in time for supper—Hartford is in New England—made impossible the deciding of any ties, for the course was flooded with cars and pedestrians. Therefore, the local agents of the Maxwell and Ford will spend more money in their printer's ink battle in the local papers and thus attract a substantial amount of paying publicity. Honors, thus far, are even.

It was possible to see from the top of the hill the starting point at the bottom, owing to the turn in the road, though one might prefer on the next occasion that there be wire communication between base and summit rather than a flag signal even when given by such an experienced one as Starter Hiram Percy Maxim. Clerk of the Course C. H. Gillette was energetic, while F. H. Elliott, A. A. A. secretary, learned of the duties of a referee.

There were all sorts of notables up and down the hill, including such trade figures as J. D. Maxwell, M. S. Hart, Col. George Pope, Charles and Wilbur Walker, D. J. Post, C. H. Veeder and Clarence Whitney, while those present also included S. L. Haynes, ex-president of the Automobile Club of Springfield; A. E. Corbin, another prominent Springfielder; W. F. Fuller, president of the Connecticut State Automobile Association, as well as of the local club; G. K. Dustin, secretary of the two organizations, and Leonard D. Fisk, one of the few at the first Florida meet.

From the finishing point of the climb a magnificent view was obtainable, embracing the Glastonbury range, the Granby hills, and the Simsbury peaks, and, from base to summit, Prospect hill was lined on both sides of the road with thousands of very curious spectators who craved speed rather than practical results.

These onlookers secured one thrill when Driver Dennison overturned at the dangerous corner in throwing a tire of his Knox car. He was dragged from underneath little worse for the experience. Subsequently, Robinson and the Stevens-Duryea "Big Six" skidded at the same place, and a police sergeant, in endeavoring to keep back the crowd, got in the way of the big car itself and had some difficulty in saving himself from injury. Summary:

RUNABOUTS, GASOLINE STOCK CARS, $1,000 OR LESS.

1. Maxwell, Maxwell-Briscoe Co.; driver, C. A. Fleming....1:08 3-5
1. Ford, Elmer Auto Co.; driver, R. Tabor.....1:08 3-5
3. Ford, Elmer Auto Co.; driver, F. W. Kulick.....1:11 3-5

GRADY AND HIS FLYING POPE-HARTFORD ROUNDING THE DIFFICULT TURN FOR THE FINAL RUSH TO THE SUMMIT.

"PETE" ROBINSON AND STEVENS-DURYEA "LITTLE SIX."

KULICK AND FORD "SIX" WERE A DISAPPOINTED PAIR.

RUNABOUTS, GASOLINE STOCK CARS, $1,001 to $2,000.

1. Jackson, A. W. Bell; driver, E. P. Blake.....1:19 1-5

TOURING CARS, GASOLINE STOCK, $1,001 TO $2,000.

1. Franklin, R. R. Ashwell; driver, A. E. Wheeler.....1:15 3-5
2. Jackson, A. W. Bell; driver, D. McCarthy.....1:17 4-5

RUNABOUTS, GASOLINE STOCK CARS, $2,001 TO $2,500.

1. Knox, Knox Auto Co.; driver, Wm. Burke.....1:02 2-5
1. Pope-Hartford, Pope Mfg. Co.; driver, J. P. Grady.....1:02 2-5
3. Corbin, Corbin Corporation; driver, J. Corbett.....1:03 2-5

TOURING CARS, GASOLINE STOCK, $2,001 TO $2,500.

1. Pope-Hartford, Pope Mfg. Co.; driver, J. P. Grady.....1:01 4-5
2. Corbin, Corbin Corporation; driver, J. Corbett.....1:07 4-5
3. Knox, Knox Auto Co.; driver, A. Dennison.....1:09

RUNABOUTS, GASOLINE STOCK CARS, $2,501 TO $3,000.

1. Corbin, Corbin Corporation; driver, J. W. Swan..... :57 1-5
2. Ford "Six," Ford Motor Co.; driver, F. W. Kulick.....1:00 1-5
3. Pope-Hartford, Pope Mfg. Co.; driver, J. P. Grady.....1:05 1-5

TOURING CARS, GASOLINE STOCK, $3,001 TO $4,000.

1. Stevens-Duryea "Six"; driver, P. J. Robinson.....1:01

TOURING CARS, GASOLINE STOCK, $2,501 TO $3,000.

1. Corbin, Corbin Corporation; driver, J. Dower.....1:08 2-5
2. Pope-Hartford, Pope Mfg. Co.; driver, J. P. Grady.....1:08 3-5

RUNABOUTS, GASOLINE STOCK CARS, $3,001 TO $4,000.

1. Thomas; entrant and driver, E. D. Seymour.....1:06 4-5

FREE-FOR-ALL, GASOLINE STOCK CARS.

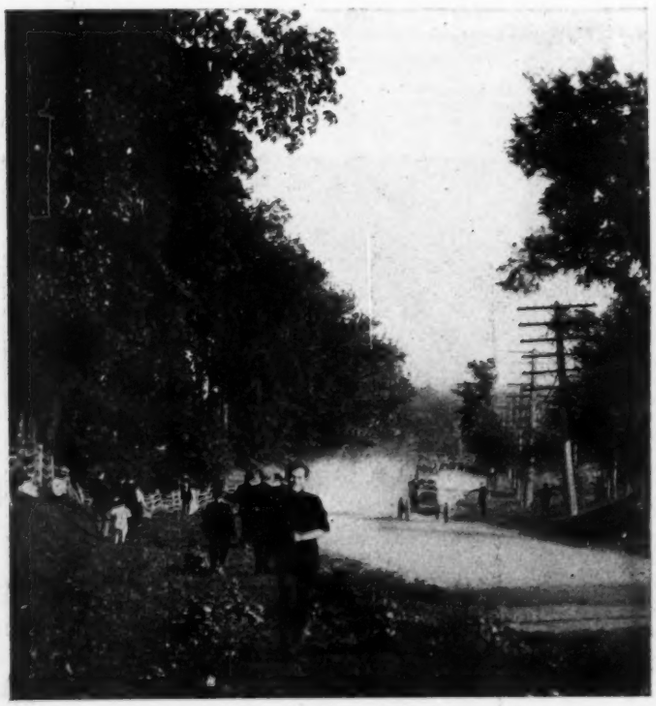
1. Stevens-Duryea "Big Six"; driver, P. J. Robinson..... :57 2-5
2. Corbin, Corbin Corporation; driver, J. W. Swan..... :58 3-5
3. Mercedes, G. E. Sykes; driver, G. E. Sykes.....1:14 4-5

FREE-FOR-ALL, GASOLINE CARS.

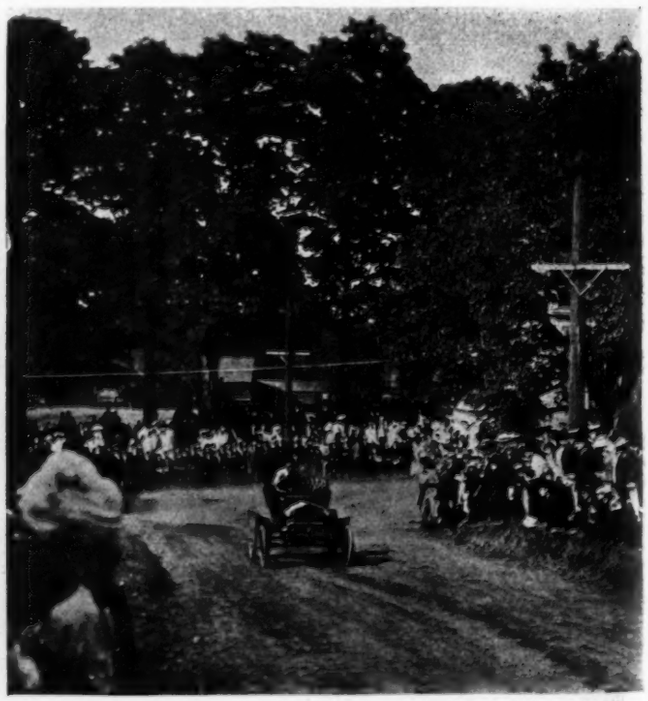
1. Pope-Hartford, Pope Mfg. Co.; driver, J. P. Grady..... :56 2-5
2. Stevens-Duryea "Little Six"; driver, P. J. Robinson..... :56 3-5
3. Corbin, Corbin Corporation; driver, James Corbett..... :57
4. Knox, Knox Auto Co.; driver, Wm. Burke..... :58 1-5
5. Thomas; entrant and driver, E. D. Seymour.....1:04 1-5
6. Mercedes, G. E. Sykes; driver, G. E. Sykes.....1:04 1-5

SLOW CONTEST, GASOLINE CARS, ON HIGH GEAR.

1. Ford "Six," Ford Motor Co.; driver, F. W. Kulick..... 6:58
2. Knox, Knox Auto Co.; driver, Wm. Burke..... 3:59



CORBETT AND AIR-COOLED CORBIN STARTING FOR THE SUMMIT.



FLEMING AND THE MAXWELL WHICH CLIMBED STURDILY.

Close Contest between Pierce and Berliet in Chicago Economy Test

PAUL HOFFMAN, TWO-TIME WINNER, IN HIS PIERCE CAR.

CHICAGO, Sept. 14.—In the second annual fuel-economy test, organized by the Chicago Motor Club and the Chicago Automobile Trade Association, a 28-32-horsepower Pierce, driven by Paul Hoffman, was most economical, its gasoline consumption for the 95-mile journey to Valparaiso and back being equal to 20.7 miles to the gallon. Last year Paul Hoffman won the first test of this nature in a 50-mile run to Cedar Lake.

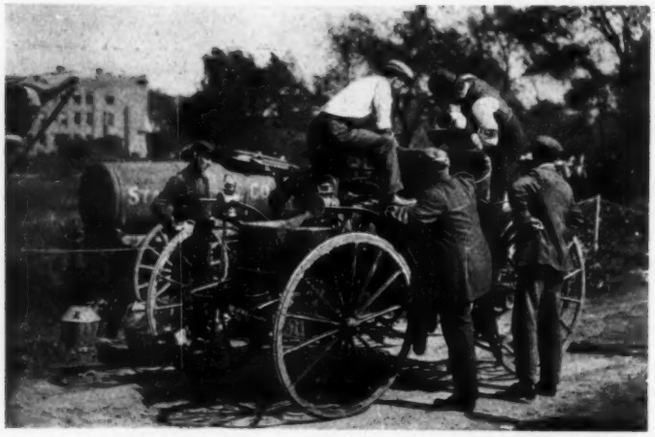
Very close to the winner was a 24-horsepower Berliet, driven by J. Buchanan, the actual difference in amount of fuel on the two cars being but four ounces, while the number of points according to the weight formula used gave a variance of but .031.

Twenty-four cars—a very representative American bunch—entered for the economy test. Gasoline was officially measured out, poured into the tanks and seals attached over night, and the competing machines left in the care of a guard until starting time on Friday morning Five minutes before 7 o'clock the pilot car, a six-cylinder Ford, with R. P. Rice at the wheel, took up the confetti bags and went away to lay the trail. There was little danger of going astray, for the Illinois Signboard Commission had inaugurated its campaign by placing guide posts over the course. In addition, cardboard signs with red arrows on them smoothed away the complications between Chicago and Highlands. Orders were that no competitor should be allowed to exceed the schedule of five hours' running time. Ideal weather conditions prevailed for a competition of this nature, but the road surface furnished an unusual quantity of puncture-producing material, which lengthened the running time. On arriving home the competing machines were again handed over to the technical committee for verification of their surplus fuel, and exercises in arithmetic were indulged in to determine the winner and official positions.

Irrespective of weight, the smallest amount of gasoline used by any one car was 2 gallons 3 quarts 15 ounces by the 15-horsepower Ford runabout driven by T. J. Hay. A 10-horsepower Holsman had the next smallest appetite, with slightly over three gallons. Worked out on the weight basis, however, the machines with the lowest net consumption were by no means as high in the list as those with heavier loads. The rules on which the test was based gave an advantage to the heavier vehicles; this was evidenced by the general desire to obtain heavy men as passengers. Last year's New York record, established by the Franklin, when 87 miles were covered on two gallons of gasoline, was never in danger of being thrown down.

The first ten cars on the list are qualified for a subsequent 200-mile economy run for the $500 Knight cup, at a date to be arranged later. They comprise two Pierce Arrows, two Berliets, Silent Knight, Diamond T, Locomobile, Corbin, Haynes and Apperson. Although the difference between two succeeding cars on the official table, as worked out on the percentage basis, is but slight, there is a wide difference in the actual fuel used by the most economical and most prodigal of the automobiles. The quantity varies from 2 gallons 3 quarts 15 ounces to over 8 gallons for less than one hundred miles. Thus, though the leaders made a remarkable run, No. 6 Pierce Arrow, No. 3 Berliet and No. 1 Pierce Arrow being very closely grouped, a number were far from being up to the standard which might be expected of them. In a test, the basis of which is the lowest possible consumption of fuel, the skill of the driver is a most important factor. Making allowance for varying degrees of ability, the official table indicates that about a third of the machines were either not properly tuned up to the higest pitch of efficiency or were naturally wasteful in their use of fuel. Due attention has not always been given to the subject of economy in fuel, but indications are that with the increasing perfection of the automobile, users will be more and more exacting in their requirements under this head and that a contest such as that planned and carried out so successfully by the two Chicago associations

ENTIRE POPULATION OF WHEELER, IND., WITNESSES THE BERLIET PASS BY.



HOLSMAN CAR TAKING ITS FUEL QUOTA BEFORE THE START.

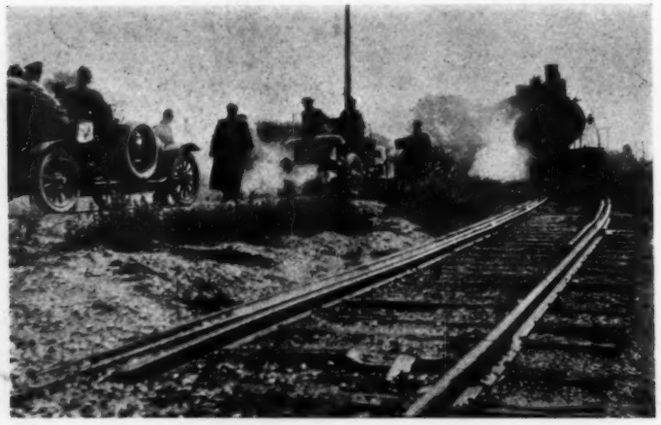
will be more numerous in the future than they have been in the past. Twenty miles to the gallon, given by the leading cars, is an excellent performance, unfortunately not attainable with every make of automobile.

CONTESTANTS, FUEL, AND OFFICIAL PLACING.

	Car	Driver	H.P.	Fuel Consumption, Wt.	Gal.	Qts.	Oz.	Per Cent.
1	Pierce-Arrow	P. Hoffman	28-30	4,545	4	2	11	3.871
2	Berliet	J. Buchanan	24	4,540	4	2	15	3.84
3	Pierce-Arrow	J. V. Lawrence	45	5,595	5	3	20	3.7
4	Silent Knight	D. Kilbourne	35-40	4,680	5	..	19	3.55
5	Diamond T.	C. A. Tilt	40	4,325	5	..	..	3.37
6	Locomobile	A. J. Banta	20	3,585	4	1	23	3.16
7	Corbin	G. H. Bird	24	3,245	4	..	11	3.102
8	Berliet	P. Grimm	24	4,778	6	..	2	3.1
9	Haynes	C. W. Birchwood	30	3,820	4	3	11	3.085
10	Apperson	N. B. McLean	40	4,760	6	1	11	2.93
11	Oldsmobile	W. L. Githens	35	3,680	4	3	29	2.88
12	Premier	H. Hammond	24	3,480	5	..	29	2.6
13	Stevens-Dur. 6.	L. Geyler	35	3,395	5	2	17	2.35
14	Kisselkar	Webb Jay	30-35	3,690	6	1	..	2.3
15	Ford runabout	T. J. Hay	15	1,675	2	3	15	2.28
16	Apperson	B. Edwards	40	4,695	8	..	28½	2.23
17	Dragon	F. Wilkins	24	3,530	6	1	29	2.129
18	Premier	Joseph Moore	24	3,340	6	1	17	2.05
19	Oldsmobile	R. C. Niemeyer	35	3,060	6	..	13	1.95
20	Maxwell	C. W. Price	16	2,710	5	3	..	1.84
21	Buick	E. L. Weiant	24	3,280	7	..	25½	1.77
22	Holsman	T. M. Powell	10	1,385	3	..	29½	1.67
23	Knox	L. B. Garrison	25	3,360	8	1	18	1.56

THAT BOULEVARD FROM BUFFALO TO NIAGARA.

BUFFALO, N. Y., Sept. 16.—For the greater part of the way from Buffalo to Niagara Falls the river road is a nightmare. The Automobile Club of Buffalo has been interested in the project of a proposed boulevard for some time past, and E. R. Thomas has consented to accept the chairmanship of a working committee which the club has deemed it advisable to name. It is only a question of time before this broad boulevard from the Queen City to the great cataract will become a reality instead of a dream.



WHERE MIGHT MAKES RIGHT OF WAY, AND NO ARGUMENT.

DARRACQ RECORD FEATURE AT PITTSBURGH.

PITTSBURGH, PA., Sept. 14.—On the resumption of racing at Brunot's Island track, William McCulla, driving a Darracq stripped touring car, covered 50 miles in 58:40 3-5, beating the Point Breeze record, established by William Wallace, also on a Darracq, by 3:7 2-5.

There were six starters in the race, namely: Two Stevens-Duryea, driven by James Kerr and C. A. Collier; Columbia, driver Eddie Bald; Pope-Hartford, driver C. H. Bromier; a Franklin, owned and driven by Mr. Palmer, and the Darracq. The two Stevens-Duryea got away first and held the lead until the fifth lap, when McCulla's Darracq got into second position. On the tenth mile Kerr's Stevens-Duryea led by a quarter of a mile. On the seventeenth mile the Franklin dropped out, and on the twenty-second mile Collier's Stevens-Duryea withdrew for fifteen minutes, came back and ran a mile, then abandoned altogether. At half distance Kerr's Stevens-Duryea was leading on the Darracq by barely 100 feet, time being 29:04.

After a neck-and-neck struggle for one mile between the Stevens and the Darracq, the former got ahead again, but shortly after the American machine withdrew and the Darracq took first place and held it to the end. The Stevens-Duryea came back for a short time, then withdrew. The only other car on the track at the finish was the Pope-Hartford.

Other events included an exhibition race between Barney Oldfield's *Green Dragon* and Ollie Savin in the *Red Devil*, the former, of course, winning; a two-mile race between a couple of Stevens-Duryea six-cylinder cars, the winning one driven by Tom Dunn; a three-mile handicap, won by a six-cylinder Stevens-Duryea, driven by James Kerr, and an open touring car race, won by Eddie Bald on a Columbia.

WHAT OLDFIELD SUPPLIED AT CINCINNATI.

CINCINNATI, O., Sept. 15.—Barney Oldfield made unsuccessful attempts Saturday to lower the world's track record with his *Green Dragon* on the Latonia course. His time for the two miles was exactly two minutes. In the first mile Oldfield got round in 1 minute and 2-5 of a second; on the second mile he was clocked in 59 3-5 seconds. To-day Oldfield covered the two miles in 1:58. In a special match between Oldfield's *Green Dragon* and Eddie Bald's *Red Devil*, Oldfield "won" by a few inches. A. V. Stegman's Stearns, driven by J. R. Rainey, covered twenty-five miles in 29:30, which is a track record for this distance, the best previous performance being 29:45. The car was not stripped in any way, with the exception of the muffler being taken off. After the race the owner got into the car and drove his family home.

The six-hour endurance run was stopped at the end of the fifth hour, when J. Sharp, in a Thomas car, had traveled 188 miles. E. Robinson, in a Franklin, was second, and O. W. Rogers, in a Thomas runabout, third, but so far behind that it was impossible for them to catch the first car.

OLDFIELD AND EX-MANAGER HAVE A SET-TO.

PITTSBURG, PA., Sept. 16.—A long-standing feud between Barney Oldfield and W. H. Pickens, his former manager, came to a head last Thursday night, when the two men exchanged blows in the corridor of the Fort Pitt Hotel. Oldfield caused to have printed an attack upon Walter Christie, in which he declared that the latter had not the steadiness to drive the machine which he had designed. Finding Pickens later, Oldfield renewed the attack upon Christie, who captured at Minneapolis, September 7, the one-mile track record, which he and Oldfield had held jointly for the past year. The old record was 53 seconds, and Christie reduced this a full second. When Christie was injured, September 9, on the first day of the meet here, Pickens came, in response to a telegram, to look after him. Resenting the remarks of Oldfield, Pickens never hesitated in starting the scrimmage, the final outcome of which was the ejection of the *Green Dragon* driver from the hotel.

POINT BREEZE'S HUNDRED-MILE WON BY A PACKARD

PHILADELPHIA, Pa., Sept. 16.—Over five thousand loyal Quakers yelled their throats raw at Point Breeze track last Saturday afternoon when young Joe Parkin, in a Packard "30," took the lead from Eddie McDuffie's 60-horsepower Mercedes on the eighty-ninth lap of the 100-mile race for the Keystone State Championship for stock cars. True, it was no fault of McDuffie that he lost the lead, which he had taken on the forty-second round. Dirty gasoline had bothered him from the seventieth mile, at which point he had over a lap on his young Quaker rival. McDuffie was bowling along at a remarkably steady pace, averaging around 1:12 for mile after mile. He had set himself a schedule of five miles in six minutes and had figured it out that that pace would win on Point Breeze track. And so it would had the unexpected not happened. His engine began to miss and volumes of bluish black smoke, which trailed after the German car, indicated that something was amiss.

This was young Parkin's opportunity and he began to push his Packard as much as the condition of the track and the ticklish turns would allow. Passing the Mercedes, he set about recovering that lost lap. McDuffie couldn't see his way clear to leave the track and remedy the trouble, for he realized that before he could get going again the Packard would have a comfortable lead, which, with but a score of miles to go, could not be overcome. And he resolved to stick it out, hoping that something might happen to the Packard or his own conditions improve. But they didn't, and each lap saw the irrepressible young Quaker a trifle nearer. It was on the eighty-ninth mile that the youthful Parkin—he's a mere boy—seeing that the big German with the little Irishman at its wheel was in real distress, opened his own engine up wide at the head of the stretch and, passing the crippled Mercedes, laid the groundwork for numerous cases of tonsilitis among the grandstand and clubhouse occupants.

McDuffie hustled into camp on the next lap, but he lost five valuable minutes, and when he reappeared the Packard was almost as many miles to the good. It was too late to save the race, but McDuffie prevented the big Frayer-Miller "50" from pre-empting the place, having a total of ninety-five miles to his credit when the finish gun cracked, as against the air-cooled car's ninety-two, the Thomas Sixty's eighty-nine, and Owen's Packard's eighty-seven.

It is doubtful whether "Kid" Parkin could have won the race without the advice and assistance of his father, who acted as his mechanic. The old gentleman was the real thing, and the nonchalence with which he changed sparking plugs and refilled his lubricators while negotiating the turns at full speed caught the crowd. Once he caught a small can of oil thrown him by one of the Packard assistants, and the car going at a forty-mile clip at the time! The old gentleman was all over the car, watching everything like a hawk.

Of the seven cars which started, four at some stage of the race held the lead, the winner and the Mercedes twice. Parkin in the Packard (No. 10) went to the front on the seventeenth mile and held it until the forty-second, when the Mercedes took command, only to lose it forty-six rounds later to the Parkin outfit. The Mercedes led at the end of the first mile, after which Tom Berger in the Oldsmobile got in front and stayed there till the thirteenth lap, when "Wally" Owen in the Packard (No. 4) came up strong, to retire four rounds later in favor of the winner.

When the touring car class was called and only two starters showed up at the tape, the Oldsmobile "30," driven by Tom Berger, and the Wayne "30," driven by William Lutton, the officials caused it to be announced that in the event of a walkover the race would be called off. After the Wayne had set the pace for five miles, which had consumed 7:53 1-5 minutes, the officials got their heads together, and, it being evident that the Oldsmobile could win at any time Berger felt disposed to let his car out, a halt was called at the end of the seventh mile and the cup awarded to the Oldsmobile. The summary follows:

25-MILE, RUNABOUT CLASS.

1. Packard, 30-h.p.; driver, "Wally" Owen..... 33:05 4-5
2. Frayer-Miller, 24-h.p.; driver, Dan Webster.....
3. Thomas, 60-h.p.; driver, William Coyle.....

25-MILE, TOURING CAR CLASS.

1. Oldsmobile, 30-h.p.; driver, T. W. Berger..... 11:00 3-5
2. Wayne, 30-h.p.; driver, William Lutton.....

(Race stopped end of the seventh mile.)

100-MILE, KEYSTONE STATE CHAMPIONSHIP—OPEN TO ALL.

1. Packard, 30-h.p.; driver, Joseph W. Parkin, Jr.....2:02:26 4-5
2. Mercedes, 60-h.p.; driver, Eddie McDuffie.....
3. Frayer-Miller, 50-h.p.; driver, Dan Webster.....
4. Thomas, 60-h.p.; driver, Wm. Coyle.....
5. Packard, 30-h.p.; driver, "Wally" Owen.....

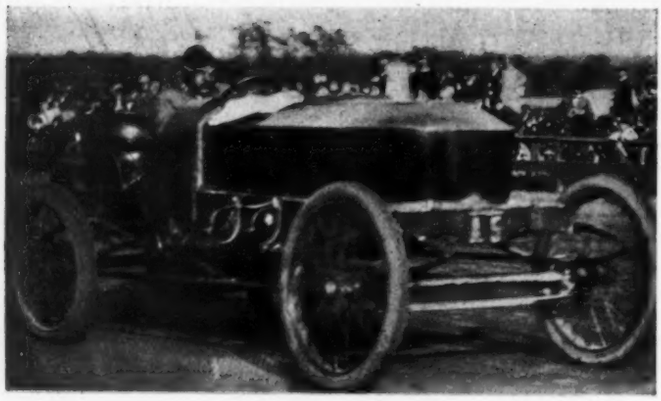
TIME AND POSITION AT END OF EACH FIVE MILES.

Miles	First	Second	Third	Time
5	Oldsmobile	Mercedes	Packard (No. 4)...	6:27 4-5
10	Oldsmobile	Mercedes	Packard (No. 4)...	12:42 2-5
15	Packard (No. 4)	Oldsmobile	Packard (No. 10)..	19:00 3-5
20	Packard (No. 10)	Packard (No. 4)	Oldsmobile.....	25:06 2-5
25	Packard (No. 10)	Packard (No. 4)	Oldsmobile.....	31:11 4-5
30	Packard (No. 10)	Mercedes	Packard (No. 4)...	37:16 1-5
35	Packard (No. 10)	Mercedes	Packard (No. 4)...	43:21 1-5
40	Packard (No. 10)	Mercedes	Packard (No. 4)...	49:42 3-5
45	Mercedes	Packard (No. 10)	Packard (No. 4)...	55:55 1-5
50	Mercedes	Packard (No. 4)	Oldsmobile.....1:01:54	
55	Mercedes	Packard (No. 10)	Packard (No. 4)...1:07:54 2-5	
60	Mercedes	Packard (No. 10)	Packard (No. 4)...1:13:54 4-5	
65	Mercedes	Packard (No. 10)	Packard (No. 4)...1:19:59 1-5	
70	Mercedes	Packard (No. 10)	Packard (No. 4)...1:25:57 3-5	
75	Mercedes	Packard (No. 10)	Packard (No. 4)...1:31:57 2-5	
80	Mercedes	Packard (No. 10)	Oldsmobile.....1:37:54	
85	Mercedes	Packard (No. 10)	Frayer-Miller.....1:43:52	
90	Packard (No. 10)	Mercedes	Frayer-Miller.....1:49:50 4-5	
95	Packard (No. 10)	Mercedes	Frayer-Miller.....1:55:52 4-5	
100	Packard (No. 10)	Mercedes	Frayer-Miller.....2:02:26 4-5	

NEW TRACK RACE RECORD MILE AT READVILLE

BOSTON, Sept. 14.—The fall race meeting of the Bay State Automobile Association, originally scheduled for Labor Day and twice postponed because of unpleasant weather, was successfully held this afternoon at the Readville track. The attendance suffered somewhat from the postponements. The weather was perfect, and the oiled track was very fast. Walter Christie had been engaged to drive a mile and five miles for the records, but his accident at Pittsburgh made it impossible for him to be present. To take his place, Charles Basle, driver for H. L. Bowden, had agreed to drive Mr. Bowden's famous Mercedes, the "Flying Dutchman" of Ormond fame, for the mile record, and Fred H. Marriott, of Newton, holder of the world's straightaway mile record of :28 2-5 seconds, had also been given permission for a mile trial. Before the races began, however, Basle, in tuning up his car, stripped a timing gear and was unable to start. Marriott, in a preliminary event, damaged his car, so that he, too, could not go for the record.

Though the troubles of Basle and Marriott prevented two events that promised to be among the most interesting of the meeting, the other races furnished ample excitement, and two new competitive records were established. One of these is 54 2-5 seconds for a mile in competition, and was made by L. H. F. Baldwin, of Providence, with his steam racer. It was made in the first heat of what was to have been a mile match, best two heats in three, between Marriott and Baldwin. Marriott's car had troubles and was out of the race when half way round. Baldwin



BALDWIN AND HIS MILE TRACK RECORD STEAM CAR.

won the second heat and race in a walkover and with a flat tire. The other new record is 1 hour 2 minutes 14 4-5 seconds for 50 miles on Readville track, and was made by the 24-horsepower Corbin, driven by J. Mattson, in the stripped stock chassis race for all motive powers. The best previous record was 1 hour 3 minutes 4-5 second, made by the Oldsmobile runabout in the stock runabout race on Memorial Day. The 50-mile chassis race was the most interesting of the day. There were four starters: 40-horsepower Berliet, driven by H. F. Grant; Ross steamer, driven by A. H. Waitt; 40-horsepower American, driven by A. J. Andrews; 24-horsepower Corbin, driven by J. Mattson.

At the start the Berliet jumped into the lead, and in the first five miles had lapped the Ross; the American was second, and the Corbin was third. At ten miles, which the Berliet covered in 11:01, the relative positions were unchanged, though the Berliet had again lapped the steamer and was a mile ahead of the Corbin. The Berliet continued to gain, but it was not until the nineteenth mile that it lapped the American, which by that time led the Corbin a mile. The time of the leading car for twenty miles was 21:15 1-5; for thirty miles, 32:44 3-4; for forty miles, 43:39. With only five miles to go, and making a splendid clip that would have landed it a winner under the hour, the Berliet had tire trouble in the forty-fifth mile. The American, which was two miles behind, also had trouble at about the same time.

The Corbin was then six miles behind, but before the Berliet and American got going again it had made up the difference, taken first place and won the race.

Though unfortunate in this race, the same Berliet car, with Grant driving, was more successful in the twenty-mile stock gasoline runabout event. It won this race in 22:19 1-5, having plenty of room to spare over its nearest competitor, a 40-horsepower American, driven by W. A. Fredericks. A 24-horsepower Corbin, driven by J. Mattson, was third.

The touring car race at twenty miles for stock cars had three entries: 60-horsepower Austin, driven by J. C. Kennedy; 24-horsepower Corbin, driven by H. E. Wilson; 24-horsepower Corbin, driven by G. A. Crittenden. The race resolved itself into a duel between the Austin and the Corbin driven by Crittenden. The Austin won eventually in 24:20, but at the conclusion of the race the Corbin owners entered a protest against the Austin, claiming that it was not equipped as per maker's catalogue, as required by the race conditions. The officials examined the car, but reserved their decision pending the production of a catalogue.

Owing to the accident to the timing gear of the "Flying Dutchman," the match race that was scheduled between that car and the old Napier Gordon-Bennett racer, holder of the Mt. Washington hill-climb record, had to be called off. The Napier, however, with F. C. Hoyt at the wheel, was driven a three-mile exhibition and demonstrated that though it was built some years ago it still has much speed. The first mile was covered in 1:01, the second in 1 minute flat, and the third in 1:01, making 3:02 for the three miles.

J. C. Kerrison, as race manager, had general charge of the meeting, while L. R. Speare acted as referee; H. W. Whipple was chief judge and A. D. Peck starter. The summary:

TWENTY MILES, OPEN TO STOCK GASOLINE TOURING CARS.

1. Austin, 60-h.p.; driver, J. C. Kennedy.....24:20
2. Corbin, 24-h.p.; driver, G. A. Crittenden.....
(Protest filed against Austin.)

MATCH RACE, 2 IN 3-MILE HEATS.

F. H. Marriott vs. L. H. F. Baldwin, both driving Stanley steam racers.
First heat won by Baldwin; time, :54 2-5.
Second heat and race won by Baldwin in walkover.

TWENTY MILES, OPEN TO STOCK GASOLINE RUNABOUTS.

1. Berliet, 40-h.p.; driver, H. F. Grant.....22:19 1-5
2. American, 40-h.p.; driver, W. A. Fredericks.....
3. Corbin, 24-h.p.; driver, J. Mattson.....

FIFTY MILES, STRIPPED STOCK CHASSIS, ALL MOTIVE POWERS.

1. Corbin, 24-h.p.; driver, J. Mattson.....1:02:14 4-5
2. Berliet, 40-h.p.; driver, H. F. Grant.....
3. Ross Steamer; driver, A. H. Waitt.....

Time by Berliet for intermediate distances: 10 miles, 11:01; 20, 21:15 1-5; 30, 32:44 3-5; 40, 43:39.

MORRIS PARK'S SECOND 24-HOUR GRIND.

The New York Automobile Trade Association is to be associated with the Morris Park Motordrome Club in the promotion of the 24-hour race at Morris Park track September 27 and 28. There are sixty-two members in the Trade Association, and J. G. Robin, president of the Motordrome Club, felt that he would like to enlist their support in the promotion of meets. This will mean that a part of the management of the meet will be in charge of E. V. Stratton, the present manager of the Trade Association.

In addition to the 24-hour event, it is planned to have a 50-mile event on Saturday under road conditions. A special course will be cut through the track that will supply hills and turns, the same as on the Vanderbilt course. There are seventeen entries in the 24-hour contest.

LONG ISLANDERS HAVE A "GRAND PRIX."

SOUTHAMPTON, L. I., Sept. 16.—On a nine-mile circuit on Shinnecock Hills, Charles L. Lawrence, on a 24-horsepower B. L. M. stock runabout, won the Grand Prix de Shinnecock, distance 45 miles, at an average speed of 50 miles an hour. The race, an invitation event, starting at half-past five o'clock on Saturday morning, was watched by Southampton society people. It will probably become an annual event.

WHITE WINS, RIVAL WRECKED IN RACE.

LOS ANGELES, CAL., Sept. 13.—In a road race between a White steamer, driven by Capt. H. D. Ryus, and an Elmore, handled by A. J. Smith, from Los Angeles to North Baldy Mountain, distance 100 miles, the Elmore overturned, pinned the driver underneath, and caused such injuries that he had to be carried back by train to Los Angeles. The White covered the distance in 4 hours 31 minutes, winning the $2,000 stakes.

SAND AND TAR AS A DUST REDUCER.

YORK, PA., Sept. 16.—Ex-Senator E. K. McConkey, one of the most enthusiastic autoists in Southeastern Pennsylvania, is experimenting at present to produce dustless roads in this locality, and within the past few weeks has reached the zenith of his ambition. Sand and tar, mixed in certain proportions, is the ex-Senator's formula, and while the two are heated to a boiling condition the substance is sprinkled along the road. The Country Club road, just south of York, which has the reputation of being one of the finest auto roads in the Keystone State, has been treated in the above manner and the objectionable dust has disappeared from that thoroughfare. Local autoists are watching the experiment with keen interest.

BEARING METAL FOR AUTOMOBILE USE*

By THOMAS J. FAY, E.E.

OF bearing metal there is much that can be said that would not interest the automobile engineer for the very good reason that the vogue in automobile work is to employ ball and roller bearings wherever possible. On the other hand, there are a few bearings in automobiles that are, as a rule, of the plain type, and it probably will be a long time ere plain bearings will become wholly obsolete.

It will be desirable then to discuss the plain bearing question at sufficient length to bring out the facts in relation to the class of plain bearings likely to obtain in automobile work.

To begin with the desired properties of bearing metal will lie within the limits as follows:

(a) The highest possible resistance to crushing strains.

(b) The greatest possible heat conductivity.

(c) The greatest anti-friction qualities.

(d) The highest possible tensile strength, not obtained at the expense of (b) and (c).

(e) The nearest approach of the elastic limit to the tensile strength.

These conditions primarily dictate the use of ball or roller bearings, but there are few, if any, engineers that are prepared to put ball bearings in crank pins for illustration, and there are other places not readily fitted with any besides plain bearings.

The materials of which plain bearings should be made must hold the right proportion of suitable elements. The right proportion, on the other hand, must be the quantities that evolve a satisfied chemical condition. Take for illustration cast iron. In this mixture carbon is in excess of the amount that can combine chemically and the excess carbon takes on the graphitic form and lays in stratæ enmeshed in the section of the structure. This excess carbon does not add to the strength of the metal, whereas, on the other hand, iron without the excess graphite is far stronger and, to make the matter somewhat more plain, a "cemented" iron or steel bearing in which all the carbon is made to combine by a cementing process becomes a very good bearing and is much used in certain places on motor cars, as, for illustration, the piston pin and its bushing are hardened.

The best possible illustration of the fact that mixtures must combine proper elements in the right proportion will be that shown in a tabulation of lead, tin, bismuth alloys, in which melting point advances and recedes, depending upon the proportion of the components present.

LEAD, TIN, AND BISMUTH ALLOYS.

LEAD	TIN	BISMUTH	Melting point of	REMARKS
5	3	8	202	It will be observed that a change in relation brings about a change in the melting point, or as may be said the freezing point, or the point of constant temperature during a change in the state of aggregation, but the change is not in proportion to any set of uniformly advancing increments.
6	3	8	208	
8	3	8	226	
8	4	8	236	
8	6	8	243	
8	8	8	254	
10	8	8	266	
12	8	8	270	
16	8	8	300	
16	16	8	304	
16	12	8	290	
16	14	8	290	
16	16	8	292	
16	18	8	298	
16	20	8	364	
16	22	8	312	
16	24	8	316	
18	24	8	312	
20	24	8	310	
22	24	8	308	
24	24	8	310	
26	24	8	320	
28	24	8	330	
30	24	8	342	
32	24	8	352	

Scientific American Cyclopedia, page 11.

To come to the point, what is the most likely to prove the most valuable for bearings is that which shows no excess of any one component over the amount sufficient to produce an "entectic" alloy. If an excess of some one component is merely a crystalline or granular mass enmeshed in the entectic, it is more likely than not a mere foreign substance free to roll about and do damage by its migration.

The manner in which balls for ball bearings are made illustrates exactly what happens when an excess of a component in granular or crystalline form is entrapped in the entectic of a metal serving for a bearing. The balls for ball bearings are put in a barrel together with oil and emery and the barrel is tilted out of a vertical plane and rotated on a pivot pin by a suitable means. The result is the balls are reduced in size and become true spheres by the continual grinding of one by the other, and were the process to continue, the balls would ultimately reduce to microscopic dimensions, but they would be spherical.

If, however, glue were to be substituted for oil and emery, there would at once be an arrest of the process. The balls would not rotate relatively and the wear would cease. This is what holds when the bearing metal is a satisfied chemical combination and the freezing process is entirely entectic, whereas, on the other hand, a mixture not entirely entectic holds unbound granules or crystals and they do the damage in two ways, *i.e.*, the migrating granules set up wear and induce heat. Of course, trouble follows a condition of this sort, if the work to be done by the bearing is enough to produce relative motion of the free—not bounded—crystals or granules as the case may be.

The Use and Utility of Dissimilar Metals.

To look at the question of bearings from still another point of vantage may result in some enlightenment, as, for illustration, it is the practice to either use two dissimilar metals, or hardened steel on steel. Why? It may not be so easy to set down the theoretical structure for these facts and yet a theory is but a statement of a fact. To begin with, like things have a common affinity, but since this is not desired in a bearing, unlike things are used. So far so good; but, hardened steel on steel works and on that account apparently contradicts the first contention. Hardened steel is a product in which the surfaces, to a considerable depth, are into a state of wear saturation of combined carbon. Either member then in a bearing, if both are hardened, has to give up and the affinity, as it were, is destroyed. On the other hand, if one member is soft and the other member is hard, the soft steel member will absorb carbon from the hard steel surface in contact, if the heat raises, and the end will be trouble because the hard member will be rendered soft and the affinity will be reestablished.

At any rate, there is every reason to believe that the molecular or microscopic structure of bearing metal has much to do with the efficiency of the product and no doubt the product that freezes under entirely eutectic conditions is the product of use for bearings. This fact is adequately established in still another way, as for illustration, it is established that a crystallized spindle cannot be made to run cool in the very journal it may have run in for years. The crystalline structure defeats anti-friction conditions because detached crystals roll relatively and set up heat.

The question of anti-friction can, in a large measure, if not entirely, be looked upon as a question of micro-structure of a given alloy, although it may be quite true that the coefficient of friction will be different for the different alloys. To clear the matter a little more, it is but necessary to say, no matter what the bearing material is, the angle in degrees on the "friction tester" will be the same, for all of them, if a certain grade of lubricating oil is used to lubricate all of them and the tempera-

*Extract from "Part V," "Materials for Automobile Construction," by Thomas J. Fay, E.E. Published by the Class Journal Publishing Company, New York.

ture is the same during the several trials. This merely proves that all bearing metals will act the same provided the lubrication is effective and the question of anti-friction is of no account at all under such conditions, because it is the oil that does the work and the bearing merely serves to act as a sustaining member for the oil. It is important then that the metal be rigid enough to sustain the oil, hence the load, because the oil is pressed out by the load.

Looking at it in another way will tend to sustain this contention, *i. e.*, no matter what the anti-friction qualities may be, for any material extant, it is not claimed and it would be futile to claim that oil could be dispensed with. Experts who have given the question of babbitt metal the greatest attention claim that the best babbitt metal is that of the greatest tensile strength without any question, no matter what may be the anti-friction value of the product. This is but another way of saying, the metal with the most perfect chemical bond serves the purpose best, because it will be the most free from enmeshed foreign matter and the least likely to set up "intermolecular shear," which nomenclature the writer will have to "coin" to make his meaning plain.

An Analysis of the Matter of Stresses.

It is said that it matters not at all if the stresses are the result of a "sliding friction" or the product of a "dead pull," and it is easy to see why this is so, for it cannot matter how the thing transpires so long as it does transpire. On the other hand, it is not so easy to show how sliding friction can put stresses in the metal of the bearing, but the stresses are present and they can be figured out as follows:

$$J = \frac{\pi d^4}{32} = \begin{cases} \text{Polar moment of inertia of the section} \\ \text{with respect to the axis.} \end{cases}$$

$C = \frac{1}{2}d$ = distance of the most remote fiber from axis in inches.

$$Pa = \frac{S\,J}{C} = \frac{\pi\, d^3 S}{16} = \frac{d^3 S}{5.1} = 0.1963\, d^3 S$$

$$d = \sqrt[3]{\frac{5.1\,Pa}{S}} = \text{Diameter of the member.}$$

$$Pa = \begin{cases} \text{Pull in pounds at a distance (a) in inches} \\ \text{from the axis may be described as the} \\ \text{moment of the applied force in inch pounds.} \end{cases}$$

$$S = \begin{cases} \text{Unit shearing resistance of the material} \\ \text{in pounds per square inch.} \end{cases}$$

All the above holds for a bearing of a given diameter if it is solid and round, but the journal box outside of the spindle is hollow and a different condition obtains. For such a case the formula should read as follows:

$$Pa = 0.1963\,\frac{d^4 - d_1^4}{d}\,S = \text{as before,}$$

and

$$d = \sqrt[3]{\frac{5.1\,Pa}{\left\{1 - \frac{d_1^4}{d^4}\right\}}}\ S = \text{as before.}$$

These formulas are mere adaptations of the conventional torsional formula and must apply perfectly for the purpose, only it is not quite so easy to fix upon the value of *P*, the pull in pounds due to friction, although it can be measured on a dynamometer. The distance (a) is any distance of the applied force, and in this case would be equal to (c), and (c), as before stated, is half the diameter or the radius of the bearing.

It is plain that *S*, the maximum torsional shearing ability of the metal, is most favorable if high, and, from what the formulæ say, the claim of high tensile strength as being a desirable requisite is borne out because high tensile strength denotes high shearing resistance.

Besides the resistance to shear, the resistance to heat is taken into account in bearings and this property is expressed as the relative degrees of heat required to overcome molecular tension, considering the various metals. The crushing strength of the metal is also a factor, and it is said that the pressure in any case should not exceed the square root of the crushing strength of the metal used. In considering the white alloys at any rate (the so-called babbitt products), their resistance to crushing, elastic limit and tensile strength all decrease as the temperature increases. This is rather disconcerting, and it looks as if a bearing can get into trouble without much effort and they generally do.

The anti-friction properties of metals are measured in a very simple way, *i. e.*, a polished steel plate is placed in a position to be tilted and a polished cube, of the metal to be investigated, is placed thereon. The plate is tilted until the unlubricated cube slides down the polished surface of the plate and the angle is noted. This is all very simple and serves the purpose perfectly, but with a film of oil, as before stated, all metals slide down the way with scarcely no difference of the angle. Therefore, to repeat, anti-friction qualities are secondary.

CHEMICAL COMPOSITION.	%
Components	
Tin	88
Antimony	8
Copper	5

PHYSICAL PROPERTIES.	
Crushing strength	31,000
Tensile strength	8,000
Elastic limit	2,300
Molecular temperature	674°
Anti-friction quality	74°

INFORMATION.

THIS IS THE OLD STANDARD GENUINE BABBITT.

The tensile strength, elastic limit and crushing strength are given in pounds per square inch.

The temperature is given in deg. F.

The angle is given in degrees.

This product, while it is far superior to white metal as generally exploited, is not of the highest attainable value.

See XXII.

CHEMICAL COMPOSITION				
CARBON	TOTAL			
	COMBINED			
	GRAPHITE			
	FERRITE			
	PEARLITE			
	CEMENTITE			
Cr.		Ni.		
V.		W.		
Mn.		Si.		
Al.		Cu.	5.0	
S.		P.		
Sn.	88.0	Zn.		
Pb.		Sb.	8.0	
As.				
PHYSICAL PROPERTIES				
T.S.	LBS. PER SQUARE INCH		8,000	
E.L.			2,300	
EX.	PER CENT.			
CO.				
PROOF	DIAM. "		1.00	
	LENGTH "		8.00	
FRACTURE				
RATING	U.			
	H.			
TREATMENT	CASTING			

SUBJECT: BEARING METAL

NUMBER: XXII MARK: BABBT

NEW YORK 11-17-07 19

CRUSHING STRENGTH 31000 POUNDS PER SQUARE INCH. MOLECULAR TEMPERATURE 674°F ANTIFRICTION ANGLE 74° THIS IS THE OLD STANDARD GENUINE BABBITT.

CHEMICAL COMPOSITION.	%
Components	
Tin	90
Copper	9.9
Antimony	trace

PHYSICAL PROPERTIES.	
Crushing strength	28,500
Tensile strength	20,500
Elastic limit	3,600
Molecular temperature	1,000
Anti-friction angle	77

INFORMATION.

This product was used for crankshaft bearings of S. & M. Simplex motors, also for the connecting road pins in the same motors.

It is also used for connecting road pin ends of the Ellsworth motors and, as may be noted, it is superior to the original genuine babbitt product in every way, especially as regards destructive temperature.

Test Record. See XXI (next page).

CHEMICAL COMPOSITION			
CARBON	TOTAL		
	COMBINED		
	GRAPHITE		
	FERRITE		
	PEARLITE		
	CEMENTITE		
Cr.		Ni.	
V.		W.	
Mn.		Si.	
Al.		Cu.	9.54
S.		P.	
Sn.	90.19	Zn.	
Pb.		Sb.	
As.			
PHYSICAL PROPERTIES			
T.S.	LBS. PER SQUARE INCH		20,500
E.L.			3,600
EX.	PER CENT.		
CO.			
PROOF	DIAM."		1.00
	LENGTH"		800
FRACTURE			
RATING	U.		
	H.		
TREATMENT			CASTING.

SUBJECT: BEARING METAL

NUMBER: XX1 MARK: FAH-RIG.

NEW YORK, 4-17-07 19

CRUSHING STRENGTH 88500 POUNDS PER SQUARE INCH

MOLECULAR TEMPERATURE 1000° FAHRENHEIT.

ANTI FRICTION ANGLE 77°

OF THIS METAL THE AUTHOR HAS USED ENOUGH FOR ABOUT 150 CRANKSHAFTS MAKING ABOUT 1050 BEARINGS WITH GOOD RESULTS IN THE S.G.M. SIMPLEX MOTORS.

IN CASTING IT SHOULD BE COVERED WITH CHARCOAL AND HEATED TO A DULL RED BEFORE "TEEMING".

There is one other phase of this bearing question that ought to have more attention, *i. e.*, no matter what may be the material of which bearings are made, they will not serve at all, especially in crankshaft work, unless they are carefully scraped to a full bearing.

Taking this fact into account and the further fact that with oil all metals have the same friction—the friction of the oil—and allowing for the fact that no metal will serve without oil, it looks as if hardened and ground steel bushings accurately fitted, with due allowance for the oil film, would serve even better than any white metal that can be devised. The hardened and ground steel bushing on hardened and ground spindles or pins, copiously lubricated, answers every theoretical requirement better by far than any white metal.

These bushings are now used to a limited extent and they work admirably where they are employed, and it would be no great surprise if they held out under conditions of service that would not be possible with any babbitt metal ever devised.

Besides white metal and hardened steel, other products are used as phosphor bronze. This product consists essentially of a copper-tin entectic and differs from the best white metals in that they are tin-copper. In the phosphor bronze the copper is the major portion, whereas, in the white metal the copper is the minor portion.

The property of the phosphorus is to deoxidize the copper and compact the micro-structure, but beyond this the phosphorus serves not at all.

PHOSPHOR BRONZE.

CHEMICAL COMPOSITION.	
Components	%
Copper	88
Tin	11
Zinc	..
Lead	..
Iron	..
Phosphorus	1.00
PHYSICAL PROPERTIES.	
Tensile strength	49,800
Elastic limit	22,100
Elongation	9.5
Reduction	....
	H 6.33
Rating	
	H 75.68

This product is used for "armor" brasses into which the tin-copper white metal is run to serve as the anti-friction facing.

In this way the strength of the phosphor bronze is preserved, while the good qualities of the white metal are utilized.

See XXIII.

There are advocates of the three components—ternary-alloys are best, but all seem to agree that more than three components are undesirable. At all events lead and zinc are not desirable for any high speed bearing work, and if three components are used they should be copper, tin and antimony, much the same as genuine babbitt.

Edward R. Hewitt, in some of his work, proceeded as follows and realized most promising results: He melted good commercial babbitt in an iron pot and "salted" it with pure tin until it became "cold short." This excess tin imparted the desired rigidity and altered the molecular temperature point to a marked extent.

While it is not possible to say just what the other components were, the fact remains that the doctoring or "salting" process netted good results and more likely than not the end was a tin-copper antimony product, in which the right proportions were found by "rule of thumb." The writer has used this process and found no ill-effects from the use of the product. Indeed, products of this making worked exceedingly well in motor crankshaft bearings, but the white metal so made was backed up by phosphor bronze "brasses."

From what has been said it will be observed that an inferior babbitt will be more or less brought within reach of an acceptable standard by remelting the babbitt and adding pure tin up to the limit of the tin carrying capacity of the product. It will be known when this point arrives by trying the product from time to time until it breaks on bending. In other words, the tin added tends to render the product "cold short." This process can be carried too far, but to do so is wholly unnecessary, because it is easy to see when the metal is short enough.

Alloy Metals and Their Characteristics.

Tin is an especially desirable content in a bearing metal for one other reason besides the fact that it engenders rigidity, because tin is non-corrosive and a large tin content renders the whole immune from corrosive influences. While it is true the oil to use is that free from corrosive tendencies, yet even so it is hard to tell just what oil will do until the damage is manifest. Tin then in excess amounts to insurance as against the ills of corrosive oil.

In the production of bearing alloys in which copper is a component there is more or less difficulty involved because of the high melting point of the copper as compared with the remaining components. With copper the possibility of using a little nickel to lower the facing point has been considered and taken advantage of. The presence of the nickel is no detriment to the bearing metal, anyway a very small increment of tin serves the purpose, *i. e.*, 1 to 2 per cent. After the copper is molten, tin can be added in large percentages as required, and following tin lead will incorporate and cement readily. Lead is a softener, just the reverse to tin, which may be classed as an intensifier. It follows, therefore, that an excess of tin may be offset by the addition of lead, or an excess of lead will be corrected by the addition of tin.

Lead is a fairly satisfactory component since it possesses lasting qualities, although its friction coefficient is a little high.

Antimony is not a good metal for bearings because it has not the requisite wearing qualities, but it does harden the alloy, and when it is present the object sought is hardness. Excesses of antimony result in an open crystalline structure. Zinc, on the other hand, is merely a cheapener and should be found in low-priced products to the exclusion of tin. This sort of a thing is quite to be tolerated, if bearings are not required to do hard work; but zinc in the bearing alloy for motor bearings is not quite the thing.

Bismuth is valuable because it tends to reduce friction, assuming the quality is worth anything in a copiously oiled bearing. On the other hand, the bad qualities of bearing alloys as a rule are not traceable to the absence of bismuth, the presence of zinc or anything of that sort, but to the use of "junk." Junk will

not produce good bearing metal nor will a mixture of junk and good metal evolve good bearing alloys. What is wanted for good bearing alloys is all good pure metal, and even in the absence of a degree of skill fair success follows the use of good materials, whereas no amount of skill can produce the best results if junk is the foundation.

In general, the question of the skill required goes up enormously if the number of components to the alloy are many. The simplest alloy holds only two metals and there are enough, unless it is desired to use up junk. Indeed, that is the incentive for the use of more than three metals in a bearing alloy. The relative values of alloys should not be far from the following, assuming the use of new raw materials only:

RELATIVE VALUES.

1.	Tin	Copper	
2.	Tin	Copper	Antimony
3.	Tin	Lead	Antimony
4.	Copper	Lead	Antimony
5.	Copper	Tin	Lead

Kent's Pocket Book, p. 33, quotes C. R. Dudley, Tour F. I., February and March, 1892, thus:

"Alloys are used as bearings in place of wrought iron, cast iron or steel, partly because wear and friction are believed to be more rapid when two metals of the same kind work together, *partly because the soft metals are more easily worked and got into proper shape,* and partly because it is desirable to use a soft metal *which will take the wear,* rather than a hard metal which will wear the journal more rapidly."

The *underscores* are by the writer with the idea of calling particular attention to the motives which can be put into other language just to see both sides. To begin with, it is said that soft metals are more easily worked, hence to use them makes the construction more easy. This is not to say soft metals are the best bearings, and again, soft metals will take the wear, but this does not say soft metals will make the best bearings.

So many of the old ideas have failed when they were applied to automobile construction that it would be no great surprise to discover that the soft metal idea is a fallacy as well; that is to say, in automobile work, with its high speed and low static pressure.

True, in crankshafts and connecting rods the bearings sustain a very heavy momentary load, but such loads are so instantaneous as not to press out the oil pad because the oil cannot be set in motion so quickly. In piston pins the instantaneous load may be as high as 1,200 pounds per square inch of projected area and no ill follows the use of hardened steel on steel. White metal would not do very well in this place, because white metal will not stand high temperature and high pressure as well, but for that matter none but the finest white metal mixtures will stand high pressure, and even then the pressure should be limited to the square root of the crushing strength of the metal.

In piston pin bearings phosphor bronze works if the bushings are very thin and backed up by steel in a most rigid way. The limit of thickness is about 3/32 inch, whereas, thicker bushing walls flatten and "run," leaving an elongated hole that soon declares itself.

Originally thin "brasses" were made for automobile work to reduce weight, but it was very quickly discovered they reduce wear, and this is a fortunate circumstance, for automobiles should be light.

Hardened steel on steel, to work nicely, should be "ground," allowing the proper bearing clearance as fixed in the "limits of tolerance" for the respective diameters; but in addition to being accurately "ground" the bearing should be worked in with "emery powder," beginning with a fairly coarse powder and ending with a comparatively fine product mixed with oil.

No attempt should be made to obtain a polished surface, for that would defeat the aim, because the emery, if the grinding process, if properly conducted, makes up a set of surfaces full of parallel grooves in which the grooves on the journal are in just position to the grooves on the hardened shell. When the bearings are so ground in, all large inequalities of surface are reduced and the vast number of oil channels cut by the emery render it impossible to squeeze out more than the excess of oil, while enough oil remains in the grooves to satisfy the demand.

Mr. C. W. Hunt, who has given such a vast amount of attention, made it a practice to grind the shafts and spindles (of the engines and machines of various classes built by the C. W. Hunt Company) excepting at the bearings. The journals were left with the tool-marks on them, and Mr. Hunt claimed that to grind the journals was to render them unfit for arduous service. The writer served as "Executive Engineer" of this company for a considerable time, and had ample opportunity to note the results, and it is an assured fact that a bearing in trouble on a machine of any sort built by the C. W. Hunt Company is a most unusual occurrence. This plan of leaving the tool-marks is on the same principle as grinding in with "emery," but the emery is superior because it produces a vast number of very small grooves, not only on the journal, but on the shell.

The question of the loss of power in motors and transmissions is a matter that must in the long run become alive. Up to the present time (1907) most designers were wont to content themselves if only motors would run and cars would endure. Whatever troubles bearings in general are heir to, these troubles are intensified in automobile work for diverse reasons, as follows:

(a) The machinery platform is unstable.

(b) The rotation of the moving parts is not a constant speed.

(c) The angular velocity is oftentimes very high.

(d) The pressure on the projected area of bearings is variable and extreme.

(e) The bearings are not rigid.

(f) All kinds of foreign substances are likely to sift into the bearings.

(g) The oil is not changed regularly, and frequently holds grit in suspension.

In general, then, bearings are hard to make and be sure of endurance, to say nothing of the question of the losses, but, as before stated, this matter must ultimately be given a due measure of attention.

Just what the distribution of losses is must depend upon the individual cars, nor can it be claimed that two cars of the same size and make would have the same efficiency of the transmission because the condition cannot be held a constant value.

In general the matter can be set down by way of a set of approximations, and as cars are perfected the approximate values will slowly advance in the direction of perfection. At the present time, for a plain bearing car, the distribution of losses will approximate as follows:

DISTRIBUTION OF LOSSES.

(Total power—100)

Delivered by motor	85
Delivered by clutch	83.3
Delivered by gear system	69
Delivered by sprocket chains	64.86
Delivered by wheel hubs	59.67
Delivered by tires to road	56.69

In thus lumping losses, it must be remembered that losses are due to many causes besides the bearing losses, and it would be a fallacy to assume that ball bearings for illustration would correct the major portion of this evil.

(This is for a direct on the high gear drive.)

(The indirect will have a different loss.)

To show that the question of losses is quite beyond the question of bearings only, it is but necessary to point out that the movement set up in the chassis springs is at the expense of power delivered by the motor or the friction in the distance rod joints sums up as a loss of motor power and so on. Indeed, every motion, every noise and every movement takes power, which to prove is very simple, as, for illustration, stop the motor and the noise, the motion and losses stop also.

AUTOMOBILE VERSUS HORSE DELIVERY

UNDOUBTEDLY the chief factor which deters the average small house from seriously considering commercial motor vehicles is reputed high cost, regarding which there appears to be an erroneous impression prevalent. To the tradesman or business house, whose delivery service is comparatively small, the first cost of a motor vehicle appears high as compared with that of horses, while his ignorance as to the expense of maintaining such an outfit does not place the latter in a favorable light. As a matter of fact, reliable data concerning automobile delivery as an investment compared with horses is difficult to obtain, so that it is not to be wondered at that the average business man knows so little of the subject and is inclined to be skeptical.

The following data has been compiled by the Logan Construction Company, Chillicothe, O., from a number of sources, as well as from their own experience with commercial motor vehicles, so that it may be taken as applicable to similar cases in almost any part of the country, though the figures given for horse maintenance will be found low in large cities. The figures representing the initial outlay will also be found very conservative. They are as follows:

Wagon	$150
Horse	150
Harness	25
	$325
Stabling and shoeing, per month	$20
Driver's wages	60
Repairs, replacements, etc.	5
	$85

Thus a house which requires three horses and wagons to handle its deliveries, has in them an investment of $975, and a monthly charge for upkeep of $255. But horses must be laid off at intervals, not to mention incapacity from sickness, so that it requires 1 1-2 to 2 horses to keep a one-horse wagon on the road all the time. At a conservative estimate, it may be said that four horses are necessary to run three wagons. This brings the investment up to $1,125 and raises the charge for maintenance to $275. As compared with the foregoing, statistics compiled from a number of sources show the expense of maintaining a light automobile delivery as follows:

COST OF CAR COMPLETE, $1,000.

Gasoline and oil, per month	$12.50
Driver's wages	60.00
Repairs, replacements, etc.	2.00
Tire depreciation	5.00
	$79.50

With proper care, the single automobile delivery wagon is the equivalent of the three single-horse wagons, so that there is a saving of $125 on the investment at the outset, while a comparison of the cost of maintenance of the two reveals a difference in favor of the automobile delivery amounting to $195 per month, or a total of $2,346 yearly. To place matters on an even more conservative basis, it may be assumed that the automobile is only capable of doing the work of two single-horse wagons instead of three, in which case its superiority in cost of maintenance would still amount to $110.50 per month.

The price of $1,000 is that of a light two-cylinder car for average delivery work, some of the figures having been compiled from the service rendered in the case of bakers. Larger cars with greater carrying capacity and higher speeds are sold at $1,500 and $1,800, at which figures they compare very favorably with the expense of maintaining sufficient horse equipment to perform the same service. One of the chief points on which the average business man is ignorant is with regard to the expense of a driver. The makers of such cars have made them as simple as it is possible to do so and neither an expert technical man nor a skilled mechanic is necessary to run them. They must be given the care required by any piece of machinery, as their reliability depends not so much on the ability of the driver to repair broken parts as it does in giving proper care and attention at the right time which will prevent such accidents.

PRACTICAL GEAR CUTTING IN AUTO WORK.

The development of the automobile industry and the use of high-speed gears have developed new conditions and new problems in the manufacture of gearing in general. says *The Mechanical World.* Perhaps a person directly engaged in the commercial manufacturing of gears of many sizes and kinds appreciates this situation better than the average man in mechanical pursuits. It is my purpose, therefore, to treat briefly of a few of these practical points in connection with gear-making and to show the tendency of the art. The degree of accuracy required for most gears to-day is much greater than it was a few years ago. The increased perfection in building many lines of machinery has had its influence, as well as the advance of the automobile industry. The high-grade motor car demands gearing which shall run at a very high speed, under severe conditions of loading and shocks, and as noiselessly as possible. To meet these conditions, accurate gears are required. While we have been able to meet these conditions with quite a degree of success, I am looking for still greater accuracy and still greater perfection in manufacturing gears in the near future. A high-grade gear should be accurate not only as regards the teeth, but as regards all its other elements. The hole should be true and of proper size. The keyways should be of the proper dimensions and accurately located. The blanks should be turned true and of exactly the right diameter. These details are sometimes overlooked or slighted even in gears which are supposed to be of high grade. It is absurd to demand high-class cutting on a poorly-machined blank. Yet this is the condition which the gear manufacturer sometimes meets with.

IMPROVED ROADS AND THE AUTOMOBILE.

An event of a certain amount of importance in connection with the use of motor cars relates to the trials made during May on certain roads in Middlesex and Berkshire with preparations of tar and tar-spreading machines for the prevention of dust, says *The Mechanical World.* It appears that the judges' committee of the Roads Improvement Association have just made the awards of prizes for the machines which they consider to occupy the first and second positions, and also for the two best tar preparations, due regard being had to the condition of the roads since the tests were made on four days in May. As the committee consists of eight leading engineers and road surveyors in addition to members of the Association, it will be necessary to attach importance to their report on its forthcoming publication. At the same time it has to be borne in mind that the trials have been made in the interest of the motor car industry, and the real object is to secure improved road surfaces for the purpose of obtaining higher speeds with automobiles. But how would this work out in practice on the assumption that prospective legislation would abolish the existing speed limit, and that the roads were covered with a dust-preventing composition? Surely the answer is to be found in the experience already gained on the Brooklands racing track, where the cement surface not only gave way during recent racing, but the concrete foundation was disintegrated and thrown about the track. If this is possible with cement and concrete, the question is whether the ordinary roads would behave any differently when tar-covered and when autos were traveling on them at only half the speed attained on the racing track in question.

LETTERS INTERESTING AND INSTRUCTIVE

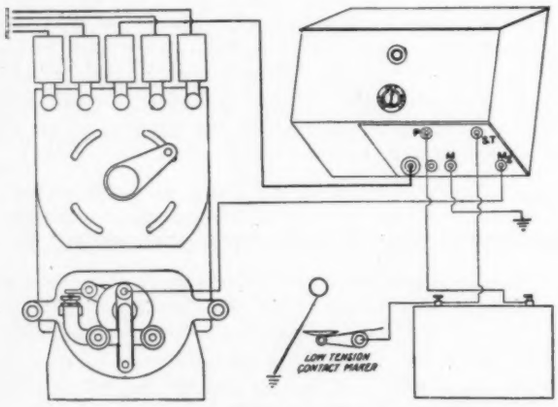
EISEMANN SYSTEM AS USED ON A PACKARD.

Editor THE AUTOMOBILE:

[901.]—Will you kindly publish in the next issue of "The Automobile," under the head of "Letters Interesting and Instructive," a wiring diagram of the Eisemann high-tension system of ignition as employed on the Packard car? FRANK AVERY.

Kalamazoo, Mich.

As employed on the Packard car, the Eisemann magneto is interconnected with a second system utilizing a set of accumulators as a source of current supply. That is, when working, the magneto operates as a self-contained system, but the same set of spark plugs and the magneto distributor are utilized, as the components of the second system already referred to. The non-vibrator coil of the magneto is carried in a case on the dash which also houses a single vibrator coil for the battery side of the system. The current from the accumulators passes through a low-tension timer of the usual type to the single vibrator coil, thence through the magneto distributor, which is turning whether the magneto is working or not, to the plugs. This is shown by the accompanying diagram, which, however, does not illustrate the inside connections of the magneto itself. One side of the armature winding is grounded; the other is carried to the terminal *Mg* on the under side of the coil box; one side of the secondary is also grounded, while the other, electrically connected to the moving member of the distributor on the magneto, is carried to the terminal shown on the coil box by concentric circles from the central terminal shown on top of the magneto distributor, the



SKETCH SHOWING PACKARD SYSTEM OF WIRING.

other four being taken to the plugs. When working on the magneto the non-vibrator coil in the case is in action, while the battery operates the vibrating coil in the same case, the terminal *P* being its primary, and *M* signifying *masse,* the French for ground connection, one side of the secondary of this coil also being grounded as usual.

REGARDING PUBLICATIONS OF A. S. M. E.

Editor THE AUTOMOBILE:

[902.]—Inquiries recently received show that your readers are not aware that the publications of the American Society of Mechanical Engineers are for sale to the general public, and further, that none of its publications is copyrighted.

The second edition of "The Art of Cutting Metals" was brought out to fill orders for Proceedings, Volume 28, No. 3, which was almost immediately exhausted after the annual meeting. So great was the interest aroused that we expect to go to press a third time with this paper early in the fall.

To correct the above mentioned misapprehension we will appreciate your making note of this in your next edition.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS,
29 West 39th St., New York City. E. S. Whitaker.

ABOUT THE USE OF OXYGEN AND ACETYLENE.

Editor THE AUTOMOBILE:

[903.]—I have a Packard "30," and would like to have some light on a few things that perplex me.

1. Granted that the oxygen in the air is the active agent which combines with the gasoline vapor in the explosion, would it not be an enormous gain in power to provide a tank of oxygen just in front of the auxiliary air intake? Even if much of the gas thus escaping from the tank did not enter, would not the fact that the air thus inhaled was more or less diluted with pure oxygen in excess of its normal content, give a great increase of explosive power?

2. Or, how would it do to provide a supply of peroxide of hydrogen ($H_2 O_2$), which gives off its oxygen, leaving water behind, contained in an atomizer just above the air valve of the carbureter, and spray the surrounding air with its vapor? Would the water thus given off, together with the oxygen, have any worse effect than the atmosphere on a rainy day?

3. Would there be any gain or loss of power if the contents of a Prest-O-Lite tank were allowed to escape under the hood, thereby compelling the carbureter to mix acetylene gas with the usual mixture?

4. On a car having a chain drive, taking the gear ratio as being 3 to 1, would it not be a saving of power to have both sprockets as

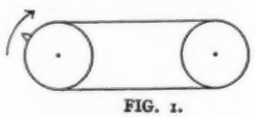


FIG. 1.

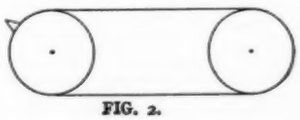


FIG. 2.

large as possible? Is there not more energy wasted in pulling the tooth on Fig. 1 than on Fig. 2? In other words, is not the lever in the sprocket of greater radius much longer, thus making the pull lighter? AL. EISEMANN.

New York City.

1. The addition of oxygen in the proper proportions would naturally give a more powerful explosion than obtainable with its more dilute form as in the shape of air. In fact, there has been considerable controversy over the use of oxygen by racing cars on the Brooklands track in England, as giving those who employ it an entirely unfair advantage over their competitors not thus equipped. The manner of employing it that you indicate would be extremely wasteful and probably not productive of much good. Its use entails the risk of producing so powerful an explosion that the motor will succumb to it, probably with disastrous consequences. Motors are not designed for the use of fuels other than those commonly employed, such as gasoline, kerosene, alcohol, under ordinary conditions, and the introduction of such a mixture might well produce an explosion far exceeding the motor's factor of safety. There are other things to be considered beside a mere increase in power. The average up-to-date automobile is already very much over-powered.

2. Your second question is open to the same objections. The method is wasteful and extremely uncertain, so that there would be imminent risk of the motor wrecking itself. The water combined with the oxygen would be no objection, could the quantity of either be properly regulated. The admission of a certain amount of moisture rather benefits the motor than otherwise, and numerous experiments have been made in water-injection just about the time of explosion..

3. This would be far more objectionable and likewise far more dangerous than either of the foregoing expedients suggested. There would be every possibility of the escaping acetylene gas combining in the proper proportions with the air under the hood to make an explosive mixture, which would sooner or later be fired with serious consequences. The latter are also to be expected of the introduction of an acetylene mixture into the cylinder as the explosion obtained with this gas is extremely powerful and not safe to employ in even the best built motor

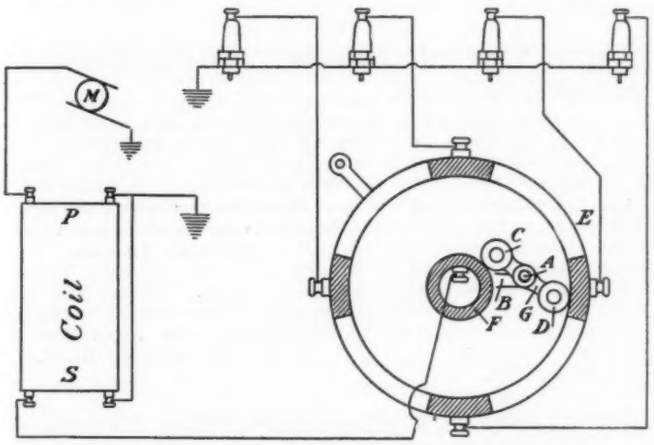
designed for gasoline. The method of employing the gas would also be equally wasteful and uncertain. Running such a combination would be about equivalent to sitting over an open barrel of powder and dropping matches into it from a little height. Most of them would go out before reaching it, but sooner or later it would go off.

4. Within certain limits larger sprockets save power and make the running much smoother, regardless of the gear ratio, by compelling the links of the chain to bend round a circle of large diameter rather than of one of small diameter which would necessarily cramp them more or less, as well as introducing a great deal of unnecessary friction. The leverage is better distributed.

ANOTHER NOVEL IGNITION SYSTEM.

Editor THE AUTOMOBILE:

[904.]—I have noticed the description of the new system of ignition being placed on the market as the "K-W" ignition, which employs what is known as a "master vibrator," but I have devised a system of ignition of my own which I think is superior. Instead of adding an extra coil and trembler to the four already in use on a four-cylinder engine, I see no reason why one coil and vibrator is not sufficient. I enclose a rough sketch from which you will see that the chief difference lies in the construction of the timer. The system, of course, requires the use of a magneto or dynamo as the primary current is not broken, as is the case with the ordinary timer in general use.



NOVEL IGNITION SYSTEM AS OUTLINED BY MR. BROWN.

To explain the sketch, the rollers C and D and their connecting link G, are insulated from the engine frame. The timer has the usual outside contact points corresponding to the spark plugs, but it also has an inside collector ring F, insulated from the engine frame, and stationary. The rollers C and D form an electrical connection between the ring F and the segments of the timer. Means are provided for rotating A at the speed of a camshaft and for holding C and D in their relative positions.

Will you kindly give me your opinion of this ignition system and state the objections you think it may have? DAVID L. BROWN.

Otto, N. Y.

There are numerou objections to your proposed system of ignition which have been sufficient to condemn its use when tried in the past—that is, its fundamental requirement of employing a continuous current. This needs a direct-current generator or a magneto which is run continuously at such a speed that its output will be of practically a uniform intensity. That is, its periodicity must be so high, such as the 60 or 125 cycle alternating current used for incandescent lighting, that there will be no interval of excessive drop in the current value at any particular point, as should the latter coincide with the time of contact the plug connected with the latter would not spark. The type of magneto generally utilized for automobile ignition does not produce such a current, but is usually synchronized with the motor and only produces a current impulse at a point corresponding to the time of firing in each cylinder. To do this, its armature is usually short-circuited upon itself and only opened twice per revolution in the case of a four-cylinder engine. The details of the various systems of magneto ignition differ considerably, but they are all based on synchronism and could not be employed for such a system as you contemplate.

The objection to the use of a magneto generating constantly, such as that previously referred to, is the same as that attaching to the use of the direct-current generator. Its speed must not alone be high, but it must be, as nearly as possible, uniform. A governor is required to prevent exceeding a set maximum, while any excessive drop such as frequently occurs in the speed of an automobile engine puts the whole system out of commission, as its mainstay—the generator—no longer produces sufficient current to operate it. Moreover, a trembler coil of the usual type would never operate satisfactorily with a current of such constantly fluctuating value. The slightest hesitation of the governor to function properly would sooner or later result in the destruction of the coil, while subjecting it to continuous use would be productive of endless trouble with the trembler. These are a few objections that strike us at first sight; doubtless those who have tried similar systems in earlier days can recall others.

MANAGEMENT OF SPARK AND THROTTLE.

Editor THE AUTOMOBILE:

[905.]—1. With car standing, ignition system O. K., spark retarded and throttle closed, the engines occasionally misfire. I am told that this is not an infrequent occurrence, and that, so long as there is regular firing at higher speeds and under load, this misfiring has no significance. I wonder whether this is correct. Does it not indicate either that the carbureter is not, or that it cannot be, accurately adjusted for the best service?

2. In adjusting a carbureter and the spark lever for the minimum service (i.e., spark retarded and throttle closed), is there any general rule as to the number of revolutions of the motor under these conditions? Should the adjustment under these conditions be such that the motor runs "as slowly as possible?" Or, assuming the maximum speed of the motor to be .... r. p. m., what should be the minimum?

3. Should the minimum adjustment as in No. 2, for best general results, be such that the motor will do some work under load? For instance, should this adjustment be such as to enable the motor to move the car on the level at minimum speed? Or is it better to figure on the motor doing no actual work except with some advancement of the spark or some opening of throttle?

4. Instructions are given, on the one hand, that the preferable operating practice is to run with advanced spark rather than with opened throttle and late spark; and, on the other hand, we are told, and we often find, that misfiring results from first advancing the spark and later opening the throttle, but not if the throttle leads and the spark follows. So much depends upon the proper manipulation of spark and throttle that I would like light upon this. If there is a general rule applicable to all gasoline motors I would like to know it, and try to work to it. If each motor and outfit must be treated as an independent proposition in this respect, I would like to know that.

5. Automobile makers often hold out the idea that a touring car will run twenty miles or more on a gallon of gasoline. I read of operators who claim to do 50 per cent. better than this. Working in the hills and using the lower speeds a great part of the time, I very often seem to get no more than eight to ten miles per gallon. When I try to work with less throttle I lose power. The question with me is not so much the cost of the gasoline, as whether I am awkwardly opening too much and getting my engines too hot. I do not know how much heating is normal when running in the hills. Water in my radiator, thermosiphon system, often boils in this work. Can you help me out on this? If so, doubtless there are others who also will benefit by it. TENDERFOOT.

Cambridge, Ohio.

As you say, this is a more or less frequent occurrence, but nevertheless it should not be. The motor should run regularly at as low a speed as it can be throttled down to, though with some carbureters it is found impossible to obtain satisfactory service at higher speeds, if adjustments be made to have the motor run without misfiring at very low speeds. In other words, the carbureter's range of adjustment is not co-extensive with that of the motor's speed range. Such cases would seem to be rare nowadays, however, and doubtless the majority of them could be remedied. It is customary in adjusting a carbureter to a motor

to set it so that it will run the latter regularly at as low a speed as possible, subsequently modifying the adjustment in order to obtain similarly good results at high speeds and under load. The adjustment need not be a great deal out of the way to cause this misfiring at low speeds, as it will readily be evident that a slight excess opening of the gasoline nozzle that would not be particularly noticeable at higher speeds when the auxiliary air-valve was also open, might pass entirely too much fuel for low speeds, as a motor will misfire on an over-rich mixture as on a very lean mixture; in fact, the case can be reversed, the extra suction of the engine at high speed drawing sufficient gasoline, and not enough when throttled down.

2. Not that we know of. It is customary to adjust the carbureter to run the motor as slowly as it can be made to do so without misfiring. As you do not supply any figure for your assumption we do not know what you had in mind, but, taking 1,500, which is probably a usual maximum speed for automobile motors having a normal speed of 1,000 r.p.m., the minimum would be about 300 r.p.m., maybe less in some cases, but not a great deal, and higher than this in a great many.

3. This adjustment is very frequently made so that the motor will move the car on a smooth, level surface, such as a garage floor, with little or no opening of the throttle. But by "this adjustment" we do not refer to that of the carbureter nozzle, but to the opening of the throttle. The latter will be found to have a stop in the majority of cases, which prevents its entire closing, and this stop is usually set to give the engine sufficient fuel to move the car on the level. As already referred to, the nozzle adjustment is usually made to run the engine at its minimum.

4. The better practice is, as you say, with advanced spark and half-closed throttle, rather than otherwise, as under such conditions the fuel is burned to much better advantage. Misfiring results from advancing the spark without opening the throttle, as the motor literally runs away from its fuel, *i.e.*, it speeds up as the result of advancing the spark and cannot then draw sufficient fuel through the restricted opening. It is good practise to either open the throttle and follow with the spark, or advance both simultaneously, as some drivers do. With magneto ignition, now very general, the spark lever position is not disturbed much, except for starting, control being entirely by throttle. This is coming to be very general practise. To a certain extent, each motor is a law unto itself and its peculiarities must be learned, otherwise general rules apply.

5. "Touring car" is too indefinite. There are thousands of touring cars which never do 15 miles on a gallon of gasoline even under the most favorable circumstances, owing to the great size of their motors, weight of the car, and the like, and many do not go much above 10 miles to the gallon. In hilly districts or heavy roads this would be less. The skill of the driver plays an important part in fuel consumption. An 18-20-horsepower car, in good condition, and under favorable circumstances, should average about 20 miles to the gallon, but frequently will not do this owing to poor adjustments. The question is not one of throttling alone; tight or poorly aligned bearings anywhere on the car will cause a great loss of power. As the size of the motor decreases, the mileage per gallon increases, single-cylinder motorcycles doing as high as 90 miles or more to the gallon. Given good conditions, it is simply a question of engine size and car weight. The fact that you are using so much gasoline and that the water boils, would seem to indicate an excessive opening of the spray nozzle, giving too rich a mixture.

OVERHEATING IN ENGINE AND GEARCASE.

Editor THE AUTOMOBILE:

[906.]—Will you kindly tell me through "Letters Interesting and Instructive" how to clean my radiator? My engine overheats quickly and I find the water in the tank has a very rusty appearance. Am not sure that the cooling system is at fault, but probably matters will be improved if I clean out the radiator. Why does my gearcase (planetary) overheat? I find it difficult to keep grease in same. The bands are not dragging, yet the case gets hot. C. G. MOORE.

Sharon, Pa.

It is not altogether certain from the few particulars you give that faulty water circulation is the cause of your engine overheating. It may be that, through neglect in filtering, foreign matter has been allowed to enter the radiator and one of the tubes is choked. This can be removed by sending a strong flow of water through the radiator by means of a powerful pump. If incrustations have formed on the tubes or the radiator is greasy, it should be washed out with an acid solution, being thoroughly flushed with water afterwards to remove all trace of the acid. Details of how to do this have frequently been given in THE AUTOMOBILE; in last week's issue one correspondent tells of a preparation he used with success to clean out a defective radiator. While you are doing this work it would be wise to verify the working of your pump. It may be that you are simply running on too rich a mixture and will find that a simple carbureter adjustment will remedy matters.

By opening out your gearcase you will doubtless at once discover the cause of overheating and the remedy will be apparent. You do not give any particulars, but we should imagine that, possibly through neglect, one or more of the pinions are not running freely on the studs. Are you sure that you are using the right kind of grease, and that proper attention has been given to lubrication?

LONG TRIP ON KEROSENE AND GASOLINE.

Editor THE AUTOMOBILE:

[907.]—As an experiment, myself and my two sons recently undertook a tour in which we relied entirely upon a mixture of two fuels, kerosene and gasoline, in the proportion of 3-4 of the latter to 1-4 of the former. The car is a four-cylinder, air-cooled machine, and we averaged 15 miles to the gallon throughout the distance, of about 500 miles, which is good going for the roads to be found through Indiana and Ohio, over which we traveled. We found that there seemed to be less heat, less vibration, better lubrication, and apparently more power. In fact, we have been so pleased with the outcome of the experiment that we have no doubt there are many readers of "The Automobile" who would like to learn of it. CHARLES L. BELL.

Columbus, Ohio.

SOMETHING FURTHER ABOUT THAT GREASE.

Editor THE AUTOMOBILE:

[908.]—In reply to a letter of inquiry (No. 887) about gear case compound, signed C. S. Weimer, printed in your issue of September 5, I am quoted as saying that I used Albany grease on the Locomobile racer in 1905. While this statement of itself is correct, yet, taken in connection with the inquiry of Mr. Weimer, it is misleading. Albany grease was used on the machine only for lubricating the water pump shaft. The gear box was lubricated with Havemeyer Gear Compound, which proved thoroughly satisfactory for the purpose.

To prevent any misunderstanding on the part of the readers of your "Letters Interesting and Instructive," will you please publish this letter in your next issue? JOSEPH TRACY.

New York City.

AT LAST ON THE RIGHT TRACK.

Editor THE AUTOMOBILE:

[909.]—Answering my own inquiry, No. 887, I desire to thank you for putting me on the track of the lubricant. The Havoline Oil Company have communicated with me, and they are the company from whom I can secure what I wish. I have sent them an order to-day.

For my own satisfaction I have hunted up the ad., which I remembered having seen in "The Automobile," and I found it in the Thursday, October 19, 1905, issue, on page 28, a full-page advertisement of the Havemeyer Oil Co. C. S. WEIMER.

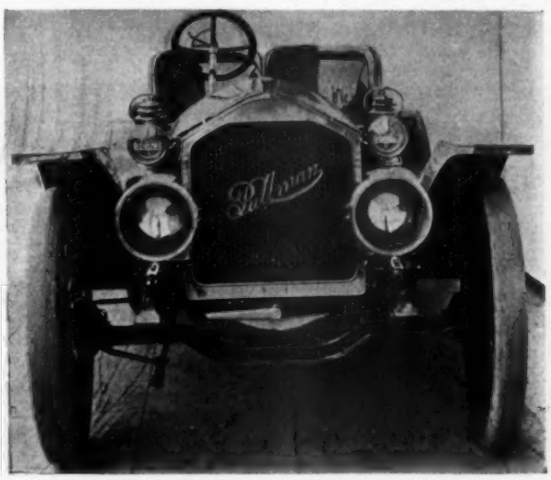
Lebanon, Pa.

There were 27,026 automobiles in use in Germany at the beginning of the present year. Of these Prussia alone had 16,084, and the province of Brandenburg, which includes Berlin, 4,028. Berlin itself had 1,976 cars registered.

MODEL J, 40-HORSEPOWER PULLMAN TOURING CAR, FULLY EQUIPPED.

WITHIN the past few years the automobile industry as a whole has become more or less sharply divided into two large classes of manufacturers; those who devote their entire attention to the construction of a single model, and those that find it more profitable to appeal to a wider range of buyers by presenting a line of models. An instance of the latter is to be found in the case of the York Motor Car Company, Inc., York, Pa., this firm planning to market a line of not less than five models during the season of 1908, two of which will be distinctive, while of the others one will be the runabout counterpart of the touring car type, one is a special six-cylinder roadster and the last a low-powered car. They will be known as Models I and J touring cars, and Models 4-40 and 6-30 runabouts, the fifth being a 20-horsepower car, the details of which are, as yet, not forthcoming.

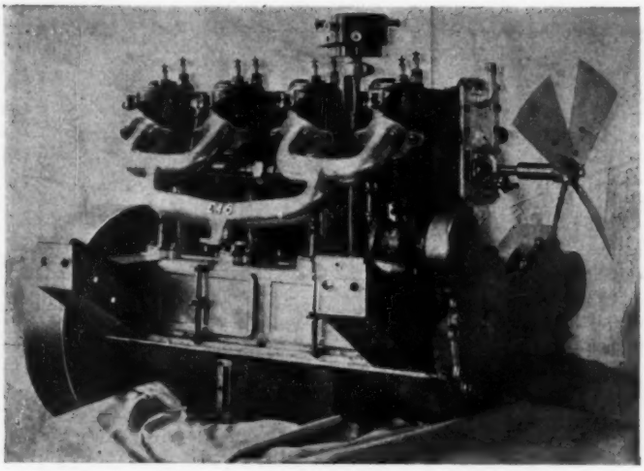
The Yorke Pullman cars, as they are known, embody numerous distinctive features of design, which are, however, substantially reproduced in each of the different models, so that a description of the Model I, five-passenger, 40-horsepower touring car will suffice to give an idea of the construction of all. The motor is distinguished by the use of independent cylinders which, however, are cast with large rectangular flanged openings in the water jackets. When the motor is assembled these flanges are bolted together, thus combining the water jacketing of all four, insuring a uniform temperature. At the ends the jacket openings are covered by plates, as shown by the illustrations of the motor. This form of construction also has the advantage of anchoring the independent cylinder castings together firmly, thus minimizing vibration and rendering the motor much stronger as a whole, while still permitting the easy removal of any one of the cylinders. In fact, from the viewpoint of the user, it has all the advantages of a four-cylinder unit casting, with none of the latter's disadvantages. It also greatly simplifies the circulation piping as the water enters the rear cylinder jacket and progresses forward through all of them. Both cylinders and pistons are ground to .001 inch on an improved Heald cylinder grinder and a special piston grinding machine, the pistons being tapered from the lower ring to allow for expansion. Three compression rings and an oil ring are fitted, while an oil groove distributes the lubricant and oils the wrist pin.



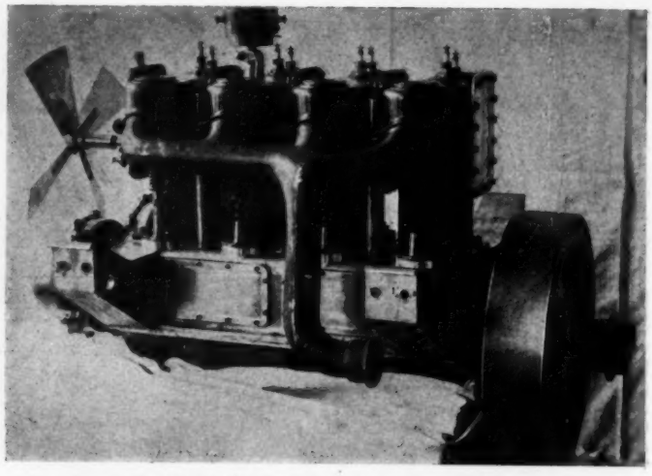
THE PULLMAN AS SEEN FROM THE FRONT.

The valves are oppositely disposed and mechanically operated; they are interchangeable and are die-forged from solid bars of nickel steel. The crankshaft is machined from a solid billet of high-grade steel and is offset from the cylinder centers, reducing the side thrust on the cylinder walls during the explosion stroke. Cramp's special bearing bronze is used for the wrist pins, and Parson's white brass for the main bearings. The connecting rods are I section drop forgings. The engine base is of an aluminum alloy of high tensile strength and carries the five main bearings. Four liberal-sized inspection plates are provided, while the casing for the timing gears is cast separately and bolted on. The bottom pan is also an aluminum casting and is divided into four oil compartments of the proper height, a sight gauge cast integral with the base serving to show the oil level.

A six-feed oiler takes care of the lubrication and is conveniently mounted on the dash, four of the feeds going directly to the cylinders, while the remaining two are branched to the five bearings and their surplus serves to maintain the level in the crankcase. The oppositely placed camshafts are also offset from the valve centers, reducing both the wear and noise to a minimum. The timing gears are of manganese bronze and of large diameter, and have a center insert of hard fiber. Cooling water circulation is by means of a centrifugal pump situated directly back of the radiator and bolted to the I-beam supporting arm of the engine base. It is gear-driven at the same speed as the crankshaft and has a capacity of eight gallons per minute at a speed of 1,000 r. p. m. It receives the water directly from the radiator and delivers it through a single pipe to the jacket of the rear cylinder. The radiator itself is of the vertical, flat-tubed type, the tubes being separated and supported by horizontal fins; it is mounted directly on the cross girder of the frame and has no connection with the side members, thus avoiding destructive torsional stresses. The fan consists



INTAKE SIDE OF 40-H.P. 4-CYLINDER PULLMAN MOTOR.



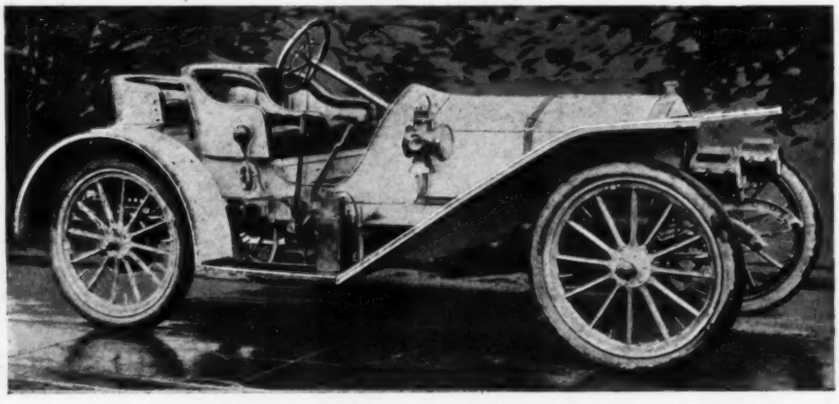
VIEW OF MOTOR AS SEEN FROM THE EXHAUST SIDE.

of a manganese bronze hub with sheet aluminum blades, the whole being mounted on adjustable ball bearings.

The ignition is of the high-tension type employing a single coil and combined timer and distributor. The coil is mounted on the dash, while the distributor is placed between the first and second cylinders, its bottom being flush with the top of the engine. It has but one adjustment and one contact for all four cylinders and runs in oil, being housed with a glass cover. The drive is by bevel gearing from the camshaft, the spindle running in bronze bearings and being lubricated from the splash in the crankcase. A set of six-volt, 60-ampere hour accumulators forms the current supply with a set of six dry cells as reserve.

A conical, leather-faced aluminum clutch is employed as the first step in the transmission of the power, the leverage of the clutch pedal being compounded so as to render its disengagement easy. It is interconnected with two automatic brakes, which bring the clutch to a stop and facilitate gear-changing without possibility of clashing. The gear set provides four forward speeds and reverse, the direct drive being on the third with the reverse idle on all the forward speeds. Shifting is on the selective plan, a movement of the lever to the right or left picking up one of the shifting levers and automatically locking the remainder. Both the pinions and their shafts are of chrome-nickel steel, the latter being supported on imported ball bearings of the non-adjustable type and the whole running in oil. The housing is of cast aluminum supported by four integral arms carried on the pressed steel sub-frame. A universal is interposed between the gear set and clutch, while two more universal joints are embodied in the cardan shaft; all are automatically lubricated and thoroughly protected from water, dust and dirt.

The rear axle is of the floating type fitted with adjustable Timken roller bearings throughout, the taper of the latter taking care of the side thrusts of the gears as well as the weight of the load. The driving shafts are one and one-half inches in diameter and are squared at the differential end, thus permitting of their withdrawal without removing the axle, and also making the gears and bearings accessible. The inner Timken bearings take all the side thrust of the bevels and provision is made for the adjustment of the latter by small plates located in the housing, made accessible by the removal of a single bolt. The axle is trussed under center of differential housing.



SIX-CYLINDER 30-HORSEPOWER PULLMAN RUNABOUT.

The front axle is one-piece forging of chrome nickel-steel, the steering knuckles being fitted with roller bearings. The frame is of the standard channel section, pressed steel type, carried on 41 by 2 1-4 inch semi-elliptic springs forward, direct connected in front and suspended by plates at the rear, and on a three-point platform spring suspension at the rear; the springs are clipped at the third leaf, each leaf having aligning flanges. The running gear consists of 34-inch wheels, fitted with quick detachable rims to take any standard American tires, the front being 34 by 4 and the rear 34 by 4 1-2.

A double set of internal expanding and external contracting brakes housed in drums on the rear wheel provide for this important essential. The steering gear is of the screw type with ball bearing cone to take up lost motion. The steering gear is mounted on one of the I-beam arms of the engine case and is suspended by a bearing on the dash. The latter is an aluminum casting curved at top and sides and is bolted directly to the frame. The wheelbase is 118 inches and the tread 56 inches. The bodies are of wood and are made complete in the home plant. With complete equipment, the Model I lists at $3,250. The chassis of the Model J is identical, but the motor is equipped with a magneto, having two separate ignition systems, even to the plugs. The body has an unusually large tonneau fitted with two comfortable extra folding and revolving seats, and the car has, in addition to its ordinary equipment, a lined cape top, with side curtains, and a folding glass front. It lists at $3,750. The Model 4-40 runabout is built on the same chassis as the foregoing with a three-speed gear set, has 108-inch wheelbase and carries a magneto as regular equipment. The weight is about 2,400 pounds, and the selling price is $3,000. Model 6-30 runabout is a special 30-horsepower six-cylinder roadster having smaller cylinders. The wheelbase is 104 inches and it is lighter throughout. It carries a magneto as regular equipment and lists at $2,750.

Thus, ranging up from a 20-horsepower four-cylinder car to a 40-horsepower touring automobile, the York Motor Car Company obtains five models, with which they can appeal to a wide range of present and prospective users.

IN THE MAKING OF A STEAM CAR.

With 35 years' experience in the manufacture of machinery on a large scale back of it, as a foundation upon which to build, the White Company would naturally be expected to embody in the construction of its new plant at Cleveland, O., the result of that knowledge gained through a long period of apprenticeship such as few other automobile manufacturers have had the advantage of. That the opportunity thus afforded has been fully availed of goes without saying; unhampered by any restrictions whatever, free play has been granted the architect, engineer and factory expert, to co-operate in the production of a plant that should lack no detail which could possibly contribute to the efficiency of production or the welfare of the operatives. The most modern ideals have been followed and the buildings are not only of single-story, fireproof construction with that most effective method of light distribution—the saw-tooth roof, but they are laid out according to a well-defined unit system with an eye toward facilitating present intercommunication and future expansion without disturbing the plant's well thought out symmetry as a whole.

Efficiency in production consists not only in having up-to-date machinery with skilled operatives to handle it, but involves as one of its chief factors what may be termed speed of progression. In every modern factory, the product advances step by step, though the various operations are carried on simultaneously and the finished product of each department is never mingled with that of another until it reaches the assembling room. But many parts must necessarily progress through various departments and it is the facility with which the raw material can be brought in and the parts in process transferred from one department to the next that has a very important bearing on the plant's capacity as a whole. In this respect, the White factory is certainly unique. Each building has a basement of its own length and 60 feet wide beneath it with which communication is had by means of electric elevators large enough to accommodate a loaded truck. In these basements, raw material is stored as well as parts, that, for some reason or other, must progress in advance of the requirements of the next department. The bodies of the White cars, which are built from beginning to end in the home plant, are an example of this, as they require eight weeks for their completion, while the plant has a capacity of ten finished cars a day, so that the body-building department's chief requirement is storage room. But one of the most decided novelties in factory construction designed solely with a view to facilitating intercommunication to the utmost, is a dividing corridor running the length of the buildings which branch from it on either side. This great artery is 600 feet long by 30 feet wide—the dimensions of a pretty fair-sized factory in itself, but it is used solely as an avenue of communication between the various departments. Its floor is of smooth concrete for the entrance of loaded trucks which may go directly into any of the departments, or from which heavy pieces may be lifted by an overhead traveling crane. Steel, concrete and glass form the chief materials of construction, wood being employed for flooring to a limited extent and for window frames, so that the buildings are considered fireproof to an extent where the company carries its own insurance risk.

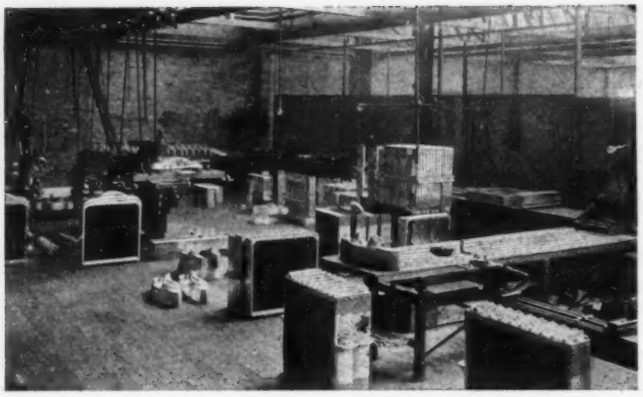
So much for the buildings themselves. With the six-story administration building of imposing proportions and the independent power plant, they constitute a group covering an impressive amount of ground as well as representing an investment that strikingly illustrates the faith of their owners in the permanence of the automobile. But it is naturally the machinery and the methods of handling the cars to be in the process of construction, that are of the greatest interest. At present the power-plant consists of a 750-horsepower Erie, compound engine, direct-connected to a 500-kilowatt direct-current generator, and a pair of 300-horsepower boilers fed by automatic stokers, coal from the railway cars being dumped directly into the storage bins. Space

WELL-LIGHTED ROOM WHERE THE WHITE CARS ARE ASSEMBLED.

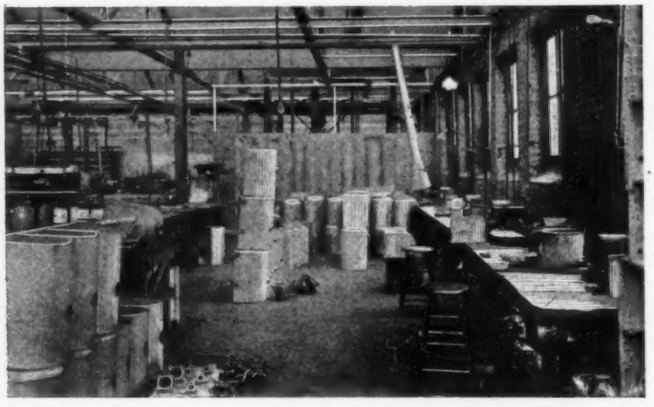
ENGINE ASSEMBLING ROOM EQUIPPED WITH TRAVELING HOISTS.

WHERE THE GENERATORS ARE ASSEMBLED AND TESTED OUT.

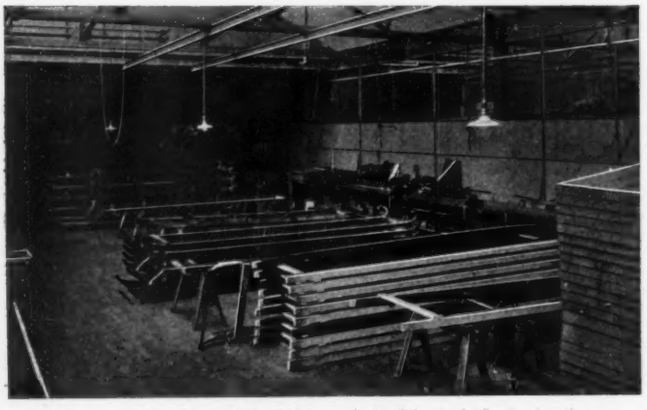
LINES OF IMPROVED MACHINES THAT HANDLE SMALL PARTS.



CONDENSERS ARE ASSEMBLED IN THIS DEPARTMENT.



SPACIOUS ROOM WHERE THE TANKS ARE MANUFACTURED.



WHERE THE REINFORCED WOOD FRAMES ARE PUT TOGETHER.

ONE OF THE BASEMENTS WHERE THE BODIES ARE STORED.

has been provided for two additional power units of the same size and another set of boilers of the same capacity. Electric motors are used throughout for driving, being directly coupled in the case of small machines, and placed in the center of each section of line shafting for driving groups of machines. This shafting is symmetrically arranged throughout the plant and so fixed that it can be removed or shifted in a few hours, this also being true of the corrugated sheet metal partitions of the various departments, to permit of rearrangement consequent upon growth, so that remodeling of the plant to suit changing needs can be accomplished as often as the latter become manifest. The overhead steel work is utilized for trackage for small hoists, as illustrated by their use in the engine assembling department. The saw-tooth roof construction renders artificial lighting unnecessary in any part of the plant, except the basement, during the day, a liberal provision of group and single incandescent lights being made for night work. Each department has its own locker room, every possible provision being made for the employé's welfare.

Given unlimited space and abundant light, the next requisite is the machine tool equipment, and it is needless to add that not alone the most modern, but the most accurate and time-saving machines thus far produced have been installed. Every detail contributing toward rapid and accurate production has been carefully studied out with the result that each machine is a law unto itself. For example, the double milling machine which faces the engine cases, once set for this particular duty, will probably cut an entire season's supply before altering its adjustment. Then there is the multiple spindle drill which bores eight holes in the rear axle housing at one operation, the specially devised machine for cutting the burner slots and a multitude of others, each of which performs a special task. One of the most important departments is the hardening room, in which there are three furnaces heated by natural gas. Here the steel, bronze and aluminum entering into the make-up of the White car undergo special treatment. After passing through the various departments producing the finished parts, the visitor comes to the assembling room which typifies the whole establishment. There are exactly so many parts and exactly so many cars to be made from them; each operation is done in the same way and on the same part of the assembling floor, and, having progressed to the end of this, the cars go to the testing rack, where the power output at the rear wheels is measured by a dynamo and rheostat in the shape of a bank of lamps. They are then taken in hand by the road testers and on the completion of this important operation are fitted with bodies, which marks the close of their factory careers.

VALUE OF THE AUTO TO THE FARMER.

Just what the farmer can accomplish with the aid of the automobile has been shown by an enterprising individual who was an autoist before he was a farmer. H. E. Hesseler, a hardware merchant, resident in Syracuse, N. Y., recently came into possession of a farm located in the neighborhood of Cazenovia, and he has found that his Franklin car is an immense help in farming operations. He can carry a crew of laborers out the five-mile trip in the morning without starting over early or wasting any time; can pull loaded hay wagons, horse rakes and hay tedders in a manner to make the most up-to-date farmer open his eyes in wonder. If anything has been forgotten or is needed in a hurry, it is only a matter of a short time to go in and be back with it from the village. As an instance of the auto's value on the farm, it may be said that the crop of hay from 75 acres was harvested in a few days and at a rate hardly conceivable by the old-timers.

Endurance runs are frequently pretty strenuous affairs in this country owing to the abominable nature of the roads, but what must they be in Germany, where, in spite of the fact that no difficulties are encountered on this score, one must be able to emit *Zuverlässigkeitsfahrt* every time he wants to refer to the performance? The Teutonic tongue is certainly strenuous.

Fashion's Autoing Fads Up-to-Date

By LAURA R. SEIPLE.

EDICTS from the oracles that dominate the automobile sartorial world set forth so many fascinating styles in coats and accessories that it is difficult to choose any one model that is "smartest." During the last few months it was evident that designers of apparel for use with the motor car were striving to give the enthusiast diversified models so that each and every woman shall be attractively and becomingly attired when she automobiling goes. There are, if possible, more stunning garments for the pastime than ever before. New materials have been introduced by enterprising manufacturers, and designers have supplied a wide range of charming models from which to choose. In fact, everything points more nearly to perfection in the way of comfortable clothing than ever before. With these facts staring us in the face and high prices for correct habiliment a consequential condition, it is the marked simplicity that is in noticeable contrast with the more bizarre fashions of a year ago.

Automobiling in the first cool days of Autumn promptly suggest change of raiment for heavier materials. Between seasons furs and fur-lined garments are uncomfortable, even on coolest nights, and this is the time attention should be turned toward clothing of proper weight, which mistake far too many persons make in the effort to economize on the seeming unnecessary extra expense of a "between-season" coat. Another between-season is coming, if they would only think of it, and the styles are now so well crystallized that it is possible to make a light or medium weight garment do service two or even three seasons if the style be excellent in the beginning. The essential factor is to patronize a reputable outfitter at the start; the price may be a trifle higher than that asked by the man who does not make a specialty of certain lines of goods, but the satisfaction received more than pays for the few extra dollars spent with the dealer who knows his business.

COAT OF SCOTCH TWEED

The capital coat for automobiling is shown in one of the accompanying illustrations. Fashioned of brown and tan plaid homespun, the model is as well cut as it is practical. Biscuit-colored leather decorates the collar and cuffs, giving enough tone to the tout ensemble to make it radically smart. Nothing could be jauntier that the little French felt "college" hat accompanying it, with its matching brown and tan plaid scarf. These hats are vastly becoming and well liked by the young contingent of automobilists. They may be tied as snugly over the head as desired without injury, and when the veil is removed the shape resumes its original lines or may be bent to suit individual taste.

With the general acceptance of the closed motor for going to and from evening functions, the automobile cloak de luxe is in order. A stunning one in rich dahlia-red rubberized silk is exquisitely embroidered with self-colored soutache braid and heavy silk threads. The sleeves are joined with narrow bands of hand embroidery and the collar, cuffs and cunning little cravat ends adorning the front are wonderful examples of needlecraft as it is being exploited in Paris. A short time ago the idea of lace or fancy needlework of any description on automobile toggery was unheard of, but with the growth of garish fashions in all classes of dress there is no telling where elaboration will cease.

Other coats of the same material are found in a large range of lovely colors, including all the new shades brought out this season, among which are Caledonia green, Laurier green, copper, pomino (old rose), elephant gray, dove gray, purple and kindred ecclesiastical tones that are fast gaining precedence over all other fancy shades. Some of these floral hues are as rich as the natural petals from which their colorings were borrowed. Another note that is an innovation of the season is the touch of foreign color added to nearly all outer garments. For instance, one of the recently unboxed cloaks now on exhibition at a fashionable outfitter's is in elephant gray Skibo serge, with touches of burnt orange velvet introduced in the collar and cuffs. The effect is strikingly pretty and so out of the ordinary that it places the garment in a class by itself.

One of the cleverest models in leather is in Caledonia green Scandinavian leather, lined with Burgundy colored silk. The length is three-quarters and the front and back are cut in a solid panel effect,

FOR THE THEATER VIA AUTO.

forming the yoke, which narrows a trifle as it descends towards the bottom of the garment. The sleeves are made with deep cuffs, to be worn turned back to form three-quarter length sleeves, or turned down to wrist length. Bands of leather and leather-covered buttons decorate the front, the high rolling collar is finished with leather frogs, and may be worn in storm effect, turned half way down, or in cape fashion, as preferred. A coat of this character is a good investment for the woman who uses her automobile for all purposes. The lovely shade of green is universally becoming and the model is dressy enough for almost any occasion.

Quite wonderful is a great coat of Irish frieze, lined with fur and outwardly decorated with stitching and strapping, a huge roll collar and deep cuffs of opossum fur in the same soft tones of the cloth. There is a strap around the waist that can be so adjusted as to completely transform the appearance of the coat, making it a tight-fitting model. The coat, as a whole, is an altogether invaluable possession for automobiling. Another charming cloak for warmth and one that is not weighty is made of cheviot-tweed in tobacco brown, with indistinct tracings of dark red threads. The body of this comfortable garment hangs in ample folds from a broad yoke, which relieves all possible crushing of the gown, also the absence of heavy dragging at the knees when the wearer is seated, which is a sad fault with so many long garments.

CALEDONIA GREEN LEATHER COAT.
Courtesy of Scandinavian Fur and Leather Company.

In the realm of millinery for automobiling there was never such diversity in styles and never such becoming shapes in small hats as the present season has brought with it. For long journeys there is a nobby little capolette with slightly "tammed" crown, upturned brim at the back and sides and visor effect in front, which may be worn either up or down, according to individual fancy. Another popular shape is the cavalier, in soft felt. Over either model veils can be perfectly arranged, and both models are generally becoming. A chic little hat in Kentong silk, that heavy Japanese weave resembling old-fashioned poplin, is in the natural dust shade. The crown is full, being shirred, as it is, to the flexible brim, which is decidedly peaked in front to break the wind. A curtain and shield protecting the back of the head and ears is held in place by elastic bands covered with shirrings of silk. The principal advantage of Kentong silk is that rain and dust have little or no effect upon it.

When it comes to the automobile vein, which comprises, these days, the useful ones for riding and driving in more ways than in automobiles, there is wide choice. The washable silk mousselines of chiffon finish with crinkled or satin striped borders, which come in all colors and from two to five yards in length, are perhaps the most practical. Besides these, there are some wonderfully attractive ones in chiffon with more elaborate borders and others covered with velvet dots both in self tones and contrasting colors. Automobile veils with shirred ring and divided at the back are a wise choice for actual automobile service. A capital veil that is creating a sensation just now is in white silk mousseline shirred on a long spring that may be adjusted to any style hat. The face has mica inserted over the eyes and a mouthpiece of Oriental lace. An inexpensive veil that is liked by many women and bids fair to become a popular favorite, is in white and pastel shades of single mesh veiling, with graduated size chenille dots sprinkled over the entire surface. This is sold by the yard, as is also a new double width maline decorated with small chenille dots. The long chiffon scarf has lost none of its former favor. Very lovely ones are being imported from the other side gorgeously decorated with gay flowers and rich Persian patterns. These are liked by women who prefer goggles to a veil when they are pressed into service mainly for the purpose of holding the hat in place. For evening wear the bizarre scarf is much in demand. The illustration on page 403, showing evening coat with hood arrangement, is fashioned of a long scarf formed in two little knots at either side of the forehead to give fullness over the hair, the back is caught with a long veil pin and the ends tied in a fetching bow at one side. This arrangement is a splendid one for going to the theatre; it covers the hair without disarranging it and offers ample protection in coldest weather.

Among the accessories there are some wonderfully practical items that have recently made their appearance. A black silk petticoat lined throughout with chamois skin is a capital idea, carried out by an enterprising manufacturer of automobile apparel. A chamois lined waistcoat is another practical garment being exploited; besides this, there is a very sensible shield or chest protector, with high collar, offering absolute warmth to the throat. These garments may be worn under various light-weight wraps with every comfort. Cloth leggings and high-topped boots are essential features in the well-ordered automobile wardrobe. They come in Scandinavian leather, suede and velvet, with fur trimmings; also finished simply with straps and stitching.

Long gloves that reach the elbow are fleece-lined and trimmed at the tops with otter fur. These are advised both for long and short sleeved coats, when they afford protection to the arms in either case, being worn, as they are, under the sleeve of wraps with wrist-length cuffs and meeting the lower edge of three-quarter lengths shown in evening wraps. The automobile glove par excellence is the white doe-skin gauntlet, while chamois-skin gloves of various lengths follow close seconds. Big buttons that are easily fastened are noticed on smartest light gloves, while on others the inserted elastic across the wrist proves most satisfactory to the wearer.

Of masks there are many and varied forms. The photograph showing face mask represents one of the most approved styles. The shape is so designed that the entire face is protected; an extra piece inserted over the nose leaves ample opening for breathing and the goggles are framed with chenille to make them rest comfortably against the face. The same style mask also comes with extra ear muffs, which will prove a boon in very cold weather. Silk and leather are equally liked for this shield, though the former is perhaps most desirable, since it is more porous than leather yet of sufficient thickness to thoroughly protect the skin from cutting winds and dust.

A knitted woolen jersey for women automobilists is among the latest fall productions. It is made perfectly plain and without a belt, and extends below the waist line. It has a becoming wide collar, to turn down, that may be fastened at will about the throat, and the cuffs are shaped and turned back. This garment makes a very cozy wrap under a large coat.

CLUB NEWS FROM THE COUNTRY OVER

UNIVERSAL LIGHTS ADVOCATED IN NEW JERSEY.

NEWARK, N. J., Sept. 16.—Secretary H. A. Bonnell, of the New Jersey Automobile and Motor Club, which now has a membership of 850, has sent a letter to each member urging them to work in unison for the enactment of a universal lights law, and increase the membership of the club, so that it will still have greater influence in defeating the passage of unjust laws aimed at automobilists. At present drivers of horse-drawn vehicles are not compelled to carry lights at night, with the result that very few do. The absence of lights has resulted in some bad accidents since automobiles became numerous and there have been many narrow escapes, in which the bright rays from acetylene lamps were all that enabled motorists to avoid running into horse-drawn vehicles that were either in the middle of the road or on the wrong side of it altogether. Another reason why the Newark club wishes to add to its membership list is the fact that the Automobile Club of Buffalo is making a strong canvass for members with the plan of becoming the second largest automobile club in the country, and Newark aspires to that honor.

There is some talk of the New Jersey Automobile and Motor Club holding races at the Waverley track on election day, November 5, but as yet nothing has been officially decided upon.

CHICAGO CLUB TO TEST SPEEDOMETERS.

CHICAGO, Sept. 16.—During the course of the coming Chicago automobile show in December next manufacturers of speedometers will be given an opportunity to put their instruments through their paces. The show is to be held during the week of November 30 to December 7, and arrangements were completed by the Chicago Motor Club at its meeting last week for the holding of a contest of this kind. At least twenty different makers of speedometers are expected to enter the trials, which will be the first of their kind in the annals of Western automobiling, if not in this country. The tests will consist of freak runs, speed matches and the like, besides a number of stunts calculated to thoroughly test the abilities of the little instruments in doing their duty under adverse conditions. The club also announced its intention of holding a stag affair for visiting autoists and tradesmen during the week of the show.

CALIFORNIA FORMS STATE ASSOCIATION.

OAKLAND, CAL., Sept. 13.—California now boasts a State automobile association affiliated with the American Automobile Association, and through the medium of the latter will be kept in touch with automobile organizations all over the country. The new association was recently incorporated, some of the moving spirits being such prominent California autoists as L. P. Lowe, Samuel G. Buckbee, Charles C. Moore, Herbert E. Law, E. R. Dimond, R. B. Hale, J. A. Britton and Oscar A. Cooper. The dues will be nominal, not exceeding $5 for the first year, this sum consisting of $2 for initiation and $3 for the annual dues. It is confidently anticipated that the association will have a long membership roll in the near future, as its objects in upholding the interests of the sport appeal to all autoists.

ALBANY CLUB POSTPONES ITS ROAD RACE.

ALBANY, N. Y., Sept. 16.—Owing to its inability to complete proper arrangements for the holding of its proposed 100-mile road race this month, the Albany Automobile Club, at a meeting held a few nights ago, decided to postpone the race until October. It is planned to hold the race on a circuit of roads south of Albany and the original plans called for holding it in September, but it was found impossible to do so.

ALABAMA CLUB TO BUILD PALATIAL CLUBHOUSE.

BIRMINGHAM, ALA., Sept. 16.—Interest in automobiling in this city as represented by the Birmingham Automobile Club is growing apace. An informal meeting was held in the office of R. S. Munger a few nights ago for the purpose of discussing automobiling prospects throughout the south in general, and in this city in particular, during the course of which it was announced that 21 life memberships had been enrolled at $1,000 each and that the required number of 30 would be made up within a short time. With the sum of $30,000 thus collected work will immediately be undertaken on the construction of the clubhouse to be erected on the Mount Pinson road. The building will be a commodious establishment, fitted up with every modern facility, and will doubtless do a great deal to aid in fostering the activity now shown by the club in maintaining the enforcement of the law governing speeding, as well as advancing the interest of the automobilist in many other ways.

LOUISVILLE CLUB TO PROMOTE RACE MEET.

LOUISVILLE, KY., Sept. 16.—At a meeting of the Louisville Automobile Club a few days ago it was decided to have an automobile parade and hold a race meet on "Louisville Day," September 18, at the Kentucky State Fair. The arrangements were placed in the hands of a special committee appointed by President G. H. Wilson. The parade will be for the purpose of showing the extent of the automobile activities of the club to the rest of the inhabitants and will be participated in by all the members. It will pass through the principal streets of the city and will disband at the Jockey Club, where the race meet will be held. An appropriation was made for prizes and all the expenses will be borne by the club treasury. The committee on parade management is composed of Eugene Strauss, chairman; Charles Chreste, J. F. Ross, Dr. H. E. Tuley and Louis H. Wymond, while the racing committee consists of Dr. J. W. Clark, chairman; Albert Reutlinger, H. Moore, J. B. Newman and Charles Mengel.

KANSAS CLUB ELIMINATES SOCIAL FEATURE.

WICHITA, KAN.., Sept. 14.—Forty autoists gathered in the parlors of the Commercial Club last night for the purpose of forming an automobile organization. It was at first proposed to organize a body on social lines, but the proposition was voted down. W. B. Throckmorton was elected temporary chairman and appointed a committee of five on permanent organization, consisting of F. A. Amsden, Thomas Arnold, Horace Williams, Scott E. Winne and Dr. Wilson. The committee decided that the name of the new organization should be the Wichita Motor League. A board of governors consisting of nine members was then elected as follows: W. B. Throckmorton, George Walker, F. A. Amsden, Scott E. Winne, S. W. Hess, C. L. Davidson, Thomas Arnold, Coler Sim and R. L. Millison

ATLANTA CLUB IS FLOURISHING.

ATLANTA, GA., Sept. 16.—For the first time since its organization about three months ago the Atlanta Automobile and Good Roads Association held a regular meeting, which took place one evening last week at the Piedmont hotel. Matters of general interest to autoists were discussed, as well as those of purely local importance, and the meeting was voted a great success. The club now has almost 100 members on its roster and the number is constantly being increased. Its officers are: F. L. Seeley, president; J. P. Stevens and E. H. Inman, vice-presidents; W. P. Andrews, secretary; Asa G. Candler, Jr., treasurer. A clubhouse, centrally located, will be the next thing considered.

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Moderate-Power Cars Coming into Their Own. From producing ridiculously underpowered and overweighted machines that could scarcely drag themselves up the easiest of grades, manufacturers have gone as far as possible toward the opposite extreme. Naturally, there has been a demand for such cars, or they would not have come into existence: the number of 50 to 60 horsepower cars now in use amply proves this. When first taken up, the plan of providing a certain percentage of excess power was found valuable to enable the car to take ordinary hills without changing gear and to pull itself out of bad places without assistance. Twenty-horsepower was thought to represent a figure sufficient for all ordinary uses, so making 30-horsepower about a standard provided a liberal factor of safety in this respect.

But then there arose a demand for a car that could take extraordinary hills on the direct drive, as the result of which a sort of modern road locomotive has been developed. It is quite as evident that such cars can never represent the ideal machine for the average autoist as that steam yachts are not for the average man. Casual observation would seem to show the day of the moderate car—both in power and price—to be further off than ever, for the majority of makers are devoting attention to the production of larger and more costly cars—six-cylinder types, in short. While this is quite true, it is equally apparent that with few exceptions these six-cylindered cars are, in the great majority of instances, mere bids for the rising tide of popular favor shown this type. Not one maker in twenty will rely for the bulk of his business on high-priced models alone during the coming season, and to a large extent this was true during the past year. "Oh, yes, we are building a number of those *large* cars, but our principal demand is for the lighter model," was a frequent answer by the maker regarding this season's output, usually meaning a 30-35-horsepower car as compared with one of 50-horsepower or over. A 20-24-horsepower car can go anywhere and do practically anything that one of twice its size is capable of, without carrying around a superfluous ton of weight to use up gasoline and tires. Both the autoist and the manufacturers are coming to recognize this, so the day of the moderate car may be said to have dawned.

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Depreciation of the Present Day Automobile. If there be any one quality for which the automobile has been maligned more than any other, when regarded in the light of an investment, it is its factor of depreciation. That a car but a season old should command scarcely more than fifty per cent. of its original selling price would seem to place it almost in a class by itself in this respect, and, indeed, such was the case in its earlier days when the value of a car dropped to about the same extent as does a piece of millinery of the year before in the face of a radical change in style. The actual mechanical depreciation in these old cars was seldom proportionate to the great tumble in their market value, as witness the number of them still in active service. The exceptions consisted of those cases in which cars had simply been done to death by careless and reckless owners who rendered them fit for nothing but the scrap heap.

To a certain extent, the same holds good to-day; there are still autoists who ruin their cars in a fraction of the time they would last with reasonable care, but the general increase in knowledge, and far more than this, the vast improvements that have been brought about, principally in the materials employed, has made such cases rare. The modern automobile does not depreciate to anything like the extent that is true of a piece of machinery of any other class, and of the same value.

That some of the best-known cars apparently are still offered second hand at ridiculously low prices would seem to support the belief that things have not changed in this respect. This is far from being the case, as an investigation of the majority of these wonderful bargains reveals the fact that most of the subjects are only fit for the scrap heap or are very much out of date. Instead of 50 per cent., 20 to 25 per cent. is now a more usual drop, except where the reduction is due to the circumstances of the seller rather than the condition of the car, and it is now uncommon to find two or three-year-old cars in good condition selling at half their original prices.

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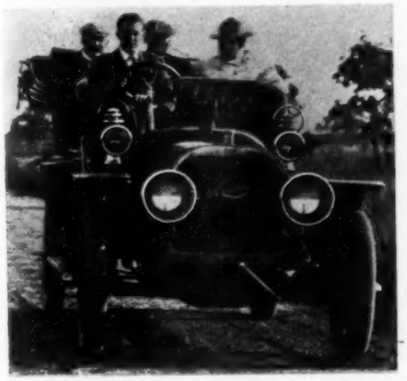
A Lesson in Preparedness from the Other Side. If forewarned is forearmed, certainly early preparation for any event, whether it be an automobile race or contest or any field of human activity whatever, is a certain guarantee of success. French automobilists, who have never been guilty of arranging their competitions with that haste which some authority has declared to be of the devil, have surpassed themselves this year. Instead of drawing up the 1908 programme during the last days of December, the Racing Board of the national club has announced the conditions and date of its only event for next year almost before the echoes of the previous race have died away. Now the A. C. F. Contest Committee, concerning itself with the more utilitarian aspect of the industry, issues its programme for 1908 before autumnal leaves have begun to fall. Thus the main lines of touring and racing in 1908 are laid down months in advance, with an advantage to the manufacturer, the dealer and the general public which needs no elaboration. There is a lesson here the learning of which by the proper bodies would benefit the American automobile industry considerably.

NO STOCK CAR RACE FOR LONG ISLAND.

There will not be any road race on Long Island this October for stock touring cars. At the meeting of the Board of Supervisors of Nassau County, held Monday afternoon, the application of the Metropolitan Automobile Association for a grant of the roads, October 16 and 17, was not presented. The exact reason may never be known, but it is probable that a combination of circumstances figure in the situation. T. F. Moore, president of the disappointed organization, insinuates that the promoters of the Long Island Motor Parkway had something to do with the change of opinion on the part of the supervisors; others assert that these same supervisors had not been convinced of the stability of the Metropolitan Automobile Association and its ability to conduct such an event in a satisfactory manner and protect the county from damage suits, etc. At any rate, there will not be a race, and naturally there is disappointment among those who advocated the holding of a contest, though some of these admit that the time was short to prepare properly for a successful race.



THREE WHO WANTED THE RACE.

Deputy Foster, Sheriff Gildersleeve, and Mr. Krug, of Krug's Corners, assisted in picking out a route in Nassau County.

Sheriff Gildersleeve and Under Sheriff Foster, in conjunction with Mr. Krug, of Krug's Corners, lent considerable assistance to the Metropolitan Automobile Association in its preliminary efforts. Supervisors Cox, Christ and Painter first said that it would be impossible to secure sufficient oil to put the roads in proper shape for the contest. But this excuse didn't hold water any better than oil would mix with it, and the reason must be searched for in other quarters.

GOOD ROADS AND GOOD LAWS CONVENTION.

Representatives of the automobile clubs of New England, as well as from clubs in New York, New Jersey and Pennsylvania, will assemble at Springfield, Mass., September 24 and 25, on which dates, under the auspices of the Automobile Club of Springfield, there will be a good roads and good laws convention. A notable array of good roads talent is assured, including the highway commissioners of most of the States, and the director of the Division of Roads of the Department of Agriculture at Washington. Of course, Robert P. Hooper, chairman of the Good Roads Board of the American Automobile Association, will be present, and accompanying him will be Highway Commissioner Joseph W. Hunter of Pennsylvania, and his deputy, R. D. Bremen. Commissioners MacDonald of Connecticut, Sergeant of Maine, and Edwards of Rhode Island are other State highway officers who will participate in the good roads session September 24.

In the afternoon good laws will be the subject discussed, and it is hoped that either President William H. Hotchkiss, of the A. A. A., or Charles Thaddeus Terry, of its Legislative Board, will present the views of the national automobile body on federal registration. In the evening will come the banquet at Cooley's Hotel, and it is promised that the speechmaking will be brief and entertaining rather than long and instructive.

Wednesday will be devoted to unfinished subjects and embrace an auto tour of Springfield and vicinity. The club expects that the affair will be the first annual of the kind, to be held each year in that city, and duplicated in other parts of the country.

NEW HOME FOR PIERCE IN NEW YORK CITY.

Pierce Great Arrow has secured a new and more elaborate New York establishment, quitting the homestead at Broadway and Fifty-ninth street for a handsome dwelling at 233-237 West Fifty-fourth street, between the Automobile Club of America and Broadway. Salesroom and executive offices occupy the first floor; the second floor is for chauffeurs and sundry stock; the third is given over to minor repairs, fitting of tires and bodies, and at the top is one of the most complete repair shops in existence, with tools and appliances necessary for the most extensive work. With the 60-foot frontage and four floors, the Harolds Motor Car Company believe they will have all the space necessary for present needs of the Pierce. General Manager Robert D. Garden has with him R. W. Slusser and R. D. Willard as salesmen. The sale and repair of Pierce machines only will be undertaken in the new premises, no cars being taken in storage.

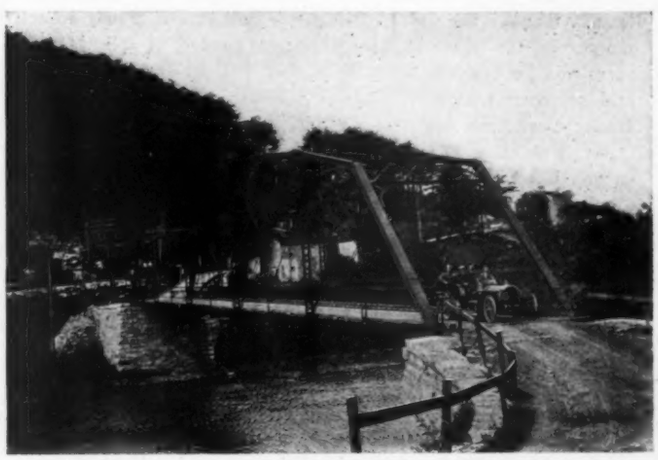
JENKINS MOTOR CAR CO., OF ROCHESTER, N. Y.

ROCHESTER, N. Y., Sept. 16.—The Jenkins Motor Car Company have filed papers of incorporation with the County Clerk. The incorporators are J. W. Jenkins, Lewis H. Whitbeck, George W. Todd, Alexander M. Lindsay, Jr., and Ira M. Ludington. The company, which is capitalized at $100,000, will manufacture high-grade automobiles of from 40 to 45 horsepower, which will be known as Jenkins cars. The company is building a plant on University avenue, near Culver road, two stories in height, and will contain about 20,000 square feet of floor space. Additional buildings are to be constructed from time to time on the two acres of ground which the company owns. About seventy-five workmen will be employed at the start. The election of officers will take place in a few days.

THE FLIGHT OF THE PEERLESS SIX.

CLEVELAND, O., Sept. 16.—Following the flight of the new six-cylinder car from Cleveland, on a demonstrating trip through the East, most enthusiastic reports have been received at the factory over the interest displayed in all the cities through which this car passed. E. H. Parkhurst, vice-president of the Peerless Motor Car Company, accompanied the party as far as Boston. He returned to the factory Thursday, and expressed great satisfaction with the showing made by the new car on this trying run.

The route selected by the party was over the roads made famous by the Glidden tour of this season. No effort was made for any remarkable speed, the trip being made purely as a pleasure and demonstrating trip. Interesting statistics are now being compiled regarding the showing made by the new six-cylinder car, which will be ready for publication on the return of the car to the factory. C. H. Burman is driving the car.



PEERLESS "SIX" CROSSING BRIDGE AT LIGONIER, PA.

BOSTON DEALERS ARE OPTIMISTIC AS TO TRADE CONDITIONS

BOSTON, Sept. 16.—More or less of a hue and cry has been raised in some sections of the country about so-called "depression" in the automobile trade, the sacrificing of cars by their owners, who have been pinched in the money market, and other things which would lead the outsider to believe that because four or five manufacturers are temporarily embarrassed the whole automobile industry is in a bad way. Now, Boston people have been hit as hard as anybody by the current state of the stock market, for they are large holders of copper stocks, and the raiding of these securities has been felt here very widely. But as for depression in the automobile trade, it is not apparent in Boston; in fact, the local trade is decidedly optimistic and looking forward to a busy season with the 1908 models.

As usually happens between the end of the selling season and the arrival of the new models, there is in progress a considerable rearrangement. Agencies for cars that have not been successful are being dropped or changed, while new agencies are being placed, and there is a kind of between-seasons uneasiness. But the dealers who have well-tried cars to sell and who have fixed up their plans for 1908 are all pretty busy, and those who have had the trial cars of the new product in town are kept on the jump following up customers, who appear to be as plentiful as ever. What is more to the point, leading dealers state that their outstanding accounts with old customers are less than usual, and new customers are buying more extras for their cars than ever before, indicating that they are not obliged to curtail.

It is not improbable that many owners will run their this year's cars another season, but that is not on account of financial stringency. It is merely a sign that the cars have become so perfected that the owners of good machines see no reason to change for a new model and they take pride in keeping their present cars going for another season. They do not fear the depreciation in their cars that has caused them to change in the past, as soon as the new models were on the market.

One of the most successful dealers in Boston is Alvan T. Fuller, who handles the Packard and the Cadillac. He has secured an increased number of cars for 1908 and is decidedly optimistic for the new season. He says: "Neither last year nor this have we noticed what has been called depression. Already we have sold 117 Packard 1908 cars, and not only have we obtained the regular prices, but our customers have ordered more in extras than ever before. Recently we took an order from a Fall River man for three cars, costing him $16,000. Another recent order was from a lady, who bought two cars costing her over $10,000."

F. A. Hinchcliffe, manager of the Winton branch in Boston, has already had many inquiries about the new Six-Teen-Six, and he expects a good demand for these cars. He says: "We have noticed no falling off. People are not so crazy to ride all the time as they used to be, but they are coming to regard the automobile as a necessary means of transportation. If curtailment is necessary, automobilists will curtail in other directions before they sell their cars. We have not heard of any Boston people selling their cars at a sacrifice because of so-called hard times."

The New England situation is well sized up by John L. Snow of the Peerless branch, who has just made a trip through New England, visiting agents. He is satisfied with the outlook and believes that there will be a larger demand for real high-grade machines than ever before in this territory. "People are learning," he says, "that it is not profitable to buy a cheap car of unknown merits and they are now demanding first-class machines. This may result in trouble for some of the manufacturers and agents who have been getting their experience in automobile building and selling at the expense of the public." President J. H. MacAlman of the Boston Automobile Dealers' Association and manager of the Columbia branch sees good prospects ahead and says he has as many orders as usual for this season.

The above are merely examples of the expressions of opinion by the Boston dealers. Here and there one is to be found who is pessimistic, but he is usually more troubled about the other fellow's chances than about his own. New Englanders as a rule do not buy cars until they feel pretty certain that they can afford to own and maintain them. When they have made up their minds on that point it takes more than the manipulation of the stock market to scare them out of it, all of which is a tribute to the stern Puritan characteristics that predominate.

NEW MANAGER FOR WAYNE COMPANY.

DETROIT, MICH., Sept. 16.—At the directors' meeting of the Wayne Automobile Company, held last week, C. R. Wilson and B. F. Everitt, of the Wilson Body Company, were elected to the directorate of the company. This change was brought about largely through the death of Roger J. Sullivan, formerly an active member of the firm. Officers were then elected, as follows: President and general manager, B. F. Everitt; chairman of the board and secretary-treasurer, Charles L. Palms; vice-president, J. B. Book; consulting engineer, William Kelley.

Mr. Everitt is known to almost every man in the trade, and is well liked and highly competent. Mr. Palms has been unable to give the Wayne company the time it deserved because of his duties in the management of the vast millions of the Palms estate, of which he is the administrator. Mr. Palms retains the same financial interest he has always held in the Wayne company, and will devote all the time he can to the general work of the company.

New agencies that will handle the "Wayne Thirty" have been closed as follows: A. L. Stanfield, Edgar, Ill.; J. L. Mott Company, Trenton, N. J.; T. S. Everitt Land Co., Redfield, S. D.

Savannah, Ga.—The Wilson Auto Company has opened a new garage at 349 Bull street. M. Ed Wilson heads the concern, which will take the agency for several lines of cars.

ANNUAL MEETING OF ROYAL MOTOR CLUB.

CLEVELAND, O., Sept. 16.—At the annual meeting of the stockholders of the Royal Motor Car Company, held September 10, the old board of directors was increased by the election of George H. Worthington, president of the Cleveland Stone Company, and F. L. Alcott, vice-president of the Diamond Portland Cement Company, the old members re-elected being Daniel Shurmer, E. D. Shurmer, S. F. Haserot, H. A. Kelley, K. F. Gill, W. J. Gawne, E. S. Reese, K. V. Painter and T. F. Newman.

At the meeting of the board following the stockholders' meeting, the following officers were elected for the ensuing year: President, E. D. Shurmer; vice-president, Daniel Shurmer; chairman, S. F. Haserot; secretary and treasurer, A. D. Hatfield; engineer, Robert Jardine. The company has just completed moving into its new plant.

A CORRECTION AS TO APPERSON PRICES.

In the issue of THE AUTOMOBILE of September 5, the price of the Apperson Model M, 30-35-horsepower car, was erroneously stated in the firm's announcement on page 66 as $2,500. It should have read $2,750. A similar error was made in the price of the 50-55-horsepower touring car which should have been $4,200 instead of $4,000.

Last Act in Europe's 1907 Race Program

CAGNO, ON ITALA, SPEEDING TO VICTORY IN EUROPE'S CLOSING RACE OF THE SEASON.

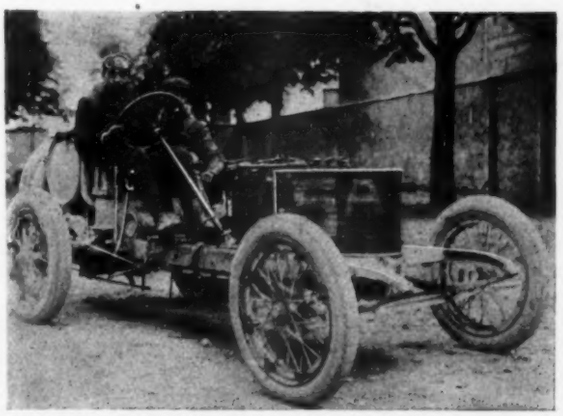
BRESCIA, ITALY, Sept. 7.—Europe's big racing program for 1908 has been brought to an end, so far as events of the first water are concerned, by a double Italian victory in the Brescia meet. Minoia, piloting an Isotta Fraschini 294.2 miles at an average of 64.7 miles an hour, was victorious under the German Emperor rules limiting cylinder area to eight liters; under Grand Prix conditions limiting fuel supply to one gallon per 9.59 miles, Cagno on an Itala took first place over the same circuit with an average of 65.3 miles an hour.

Brescia being too small to lodge all the interested spectators gathered together from all points of Europe, those unable to find a bed curled themselves up in their cars, if they possessed them, in railroad carriages, or in any other place that offered the little protection needed from the mild night air. The electric lights around the grandstands and the little patronized betting booths gave way to the sun, record crowds flocked to the track, the animated buzz of conversation was hushed as the crack of a pistol rang out, and Ceirano opened the game by driving off on his S. P. A. at 5:30 o'clock. Demogeot followed on Darracq, the others starting at intervals of 30 seconds with perfect regularity until Fitz Earle, on a Benz, closed the list of 34 competitors from four different countries.

Demogeot was first to finish the initial round of 37.7 miles, followed by Trucco's Isotta Fraschini, Ceirano's S. P. A., Durlacher's Wolsit, Viton's Rochet Schneider, Cagno's Itala, and Minoia's Isotta Fraschini. The fastest time on this first round was made by Minoia's Isotta Fraschini at an average speed of 67.1 miles an hour. The second round was slightly faster.

At the end of the second round Minoia's Isotta Fraschini was still leading, with Vincenzo Florio's Darracq, driven by Airoldi, a good second; the others in order being: Cagno on an Itala, Viton on a Rochet Schneider, Hemery on a Benz, and Demogeot on a Darracq. Several accidents occurred during the third round. Hieronymus, who drove in a daredevil manner, broke his nose through a collision with another machine; Durlacher, the driver of the Wolsit, dropped off the railroad bridge and had to be carried to the hospital; Hemery's mechanic fell from the Benz near the grandstand, rolled over several times, but was not seriously hurt.

At the end of the fourth round, half time, Minoia's Isotta Fraschini was first, a Rochet Schneider second, Demogeot's Darracq third, Hanriot on a Benz fourth, Darracq fifth, and Isotta Fraschini sixth. Out of thirty-four starters, only eighteen remained on the course. All news came in from outside during the fifth round. The steering gear of Baron de Martino's Zust broke when traveling at high speed, killing the unfortunate driver on the spot.



DEMOGEOT, WITH GRAND PRIX DARRACQ, CAME SECOND.

Although Minoia lost a little of his speed during the last two rounds, he was never seriously menaced for first position, his lead at the end of the 302 miles being ten minutes over Hemery's Benz and nearly eighteen minutes over Hanriot's machine from the same factory. About a year ago Isotta Fraschini was bought by Lorraine-Dietrich, the Italian car which won the race being identical with the Dietrich from Luneville, with the exception of the radiator and the hub caps. On these grounds the French claim the victory as theirs. Michelin, who equipped the winner with rims and tires, has a performance to be proud of, the Isotta Fraschini starting and finishing the last race with the same set of tires. Second, third, fourth, fifth and sixth machines were also shod by Michelin and fitted with his dismountables.

Although France provided two of her best drivers for the second and third arrivals, the first position taken by an out-and-out French production was fifth place by a Rochet Schneider. Sixth place also went to Rochet Schneider and Darracq took seventh and eighth positions. Itala was unfortunate throughout. Henry Fournier went out on the first round. Cagno disappeared on the second round, and Fabry joined him on the fourth round. Bianchi might have done better had not Hieronymus collided with the firm's best driver.

Twenty shaft-driven and fourteen chain-driven machines started in the race. The proportions in which chain and cardan finished was 58 per cent. for the former and 30 per cent. for the latter. Military not being obtainable to guard the course, volunteers performed the service in a manner that gave entire satisfaction. Although there was a record crowd the track was never invaded at any time. Last year the Brescia meet had to be abandoned owing to the refusal of the Minister of War to give aid.

The same starting point, the same crowd, the same enthusiasm, and again an Italian victory. For the second day of the Brescia meet Grand Prix conditions had to be observed, seven of the machines being those which had actually taken part in the big race on the Dieppe circuit last July. Cagno, unfortunate the previous day, came out victor at the end of this 302-mile race by driving his Itala car for 4:37:36 in pouring rain at an average speed of 65.3 miles an hour. There were

fourteen starters, half of them French and half of them Italian. The French had the enormous advantage of all having run in the Grand Prix; the Italians, including the Itala on which Cagno secured his victory, were all being tried out for the first time.

It is a severe blow to the French industry that in only one speed contest this year has she been victorious. All along the line Italy has won in such a convincing manner that it is impossible for the most patriotic supporter of the "national industry" to deny the importance of the success. Michelin equipped the winner with anti-skid tires—the heavy rain made the use of the steel studded band imperative—and, as on the previous day, supplied one set which held up from the beginning of the first to the end of the eighth round. That two cars should each cover over 300 miles at an average speed of more than 64 and 65 miles an hour without a moment's tire trouble is a wonderful performance. Demogeot, who came second on a Darracq, three minutes behind the winner, had four Dunlops which started and finished the race.

Cagno's compatriots were not fortunate, all of them dropping out of the race—most of them on account of mechanical defects—before half time. Two French machines failed to finish. Duray, driving a Lorraine Dietrich, skidded seriously on one of the turns, when leading by five minutes, and damaged his steering gear. After a hurried repair he set out again, led the Itala at the end of the fifth round, and appeared a certain winner when his car took fire and he had to abandon. E. Fitz Shepard, on a Bayard-Clement, was second, three minutes behind Duray, at the end of the fourth round, when his course was brought to an end by the car jumping over the Montichiari bridge. Six machines were left to finish, their order being Itala (Cagno), Darracq (Demogeot), Dietrich (Rougier), Dietrich (Gabriel), Bayard-Clement (Alezy), Bayard-Clement (Garcet). In addition to winning the race, Cagno made the fastest round, at an average speed of 71.9 miles an hour. In the French Grand Prix Wagner made an average of nearly 75 miles an hour for one round, driving a Fiat.

THE SPEED TROPHY.

Grand Prix Rules.

Itala, Cagno.....4:37:36
(Average 65.3 miles per hour.)
Darracq, Demogeot 4:40:43
Dietrich, Rougier 4:45:31
Dietrich, Gabriel 4:50:35
Bayard-Clement, Alezy...4:53:58
Bayard-Clement, Garcet.4:59:22

Those which failed to finish included Dietrich, Diatto A. Clement, S. P. A. (3), Itala (2), Bayard-Clement.

FLORIO CUP.

German Emperor Rules.

Isotta Fraschini, Minoia.4:39:53
(Average 64.7 miles an hour.)
Benz, Hemery 4:49:49
Benz, Hanriot 4:57:47
Isotta Fraschini, Trucco.5:05:56
Rochet Schneider, Vitton.5:06:55
Rochet Schneider, Thieulin 5:07:25
Darracq, Demogeot 5:10:43

Also finished: Darracq, Bianchi, Benz, Gaggenau, Junior, Wolsit.

PROGRAM COMPLETE FOR FRENCH 1908 CONTESTS

PARIS, Sept. 9.—Meeting for the first time after the Coupe de la Presse, the Competition Committee of the Automobile Club of France has drawn up its program for 1908. Next April there will be an industrial vehicle competition, and in August the Coupe de la Presse will be run again on exactly the same basis as this year. It depends on the attitude of the government whether the preliminary touring event, forming a part of the Press Cup contest, will be over open roads or not. Should permission be refused the tour will have to be held on a guarded circuit. Body dimensions, weight limits and amount of fuel per 100 kilometers will remain unchanged. These two events will be the only utility contests organized directly by the A. C. F. The Racing Board having given full particulars of date and conditions of the Grand Prix, the only event it will undertake, manufacturers are able to lay their plans for next season's public performances with assurance.

On the proposition of the Marquis de Dion the Commission has decided to consider the question of a permanent closed circuit in some mountainous district. Conditions required are about 25 miles round, several 10 per cent. grades not less than a kilometer in length, wide and well-made roads. The permanent circuit will not be in any sense an autodrome; twenty-five miles of good road in the Alps, the Vosges, or the Cevennes would answer the purpose. This project is independent of the one under consideration by the Racing Board, the requirements of that body being something in the nature of the Dieppe circuit.

LOZIER LINE TO INCLUDE A SIX-CYLINDER.

For the past twelve months the builders of the Lozier have been planning the addition of a six-cylinder car to their line for 1908, and it has finally been decided to add a 50-horsepower, shaft-driven car of this type to the Lozier family for the coming season. It will be known as Type I and will be practically the same as the new Lozier recently described in detail in THE AUTOMOBILE. The only exception will be found in the motor, which will consist of six cylinders cast in pairs, their dimensions being 4 5-8 inch bore by 5 1-2 stroke. Under the recently adopted A. L. A. M. formula, which the Lozier company has been one of the first to adopt officially for all their ratings, the output of the new six is slightly over 50 horsepower, and it has been given this designation. Under previous ratings it would have been called a "60," and it will have a speed of something like 70 miles an hour.

The motor will have a ball-bearing crankshaft, double ignition system, using a Bosch magneto, and set of accumulators, as well as all the other distinguishing features of the Lozier motors of the four-cylinder type. The wheelbase is 131 inches and the radiator is placed directly over the front axle. With touring car body and equipment the new six cylinder will list at $6,000, the other members of the line being a 40-horsepower four-cylinder, chain drive, and a 45-horsepower, four-cylinder, shaft drive.

The recently organized B. & H. Motor Company, 147-151 West Forty-ninth street, New York City, has been admitted to membership in the New York Automobile Trade Association.

DETAILS OF THE RAINIER FOR 1908.

In announcing the specifications of the new Rainier for 1908, the builders call attention to the fact that its construction will be characterized by an entire lack of castings in places where the latter have usually been employed, such as for brake drums, differential housings and the like, lighter and stronger die-forgings of steel being used instead. Other features of note are the greatly simplified and improved low-tension ignition system using a Bosch magneto; the multiple disk clutch with cork inserts and a new and original type of automatic carbureter with air control on the dash. The gear-set provides four speeds forward, working on the selective plan of operation with the direct drive on the third, the shafts of the gear-set as well as the differential and wheels, all being mounted on F. & S. non-adjustable ball-bearings. The main motor bearings are of white babbitt enclosed in bronze cases. The rear-axle unit is the same as on previous models but has been considerably strengthened and provided with a double torsion rod, while the propeller shaft brake has been done away with, both sets of brakes now being of the internal expanding type and are located in hubs on the rear wheels, the latter now being 36 inches in diameter, shod with 4-inch tires front and 4 1-2-inch rear. The motor dimensions are 5 by 5 1-4 inches bore and stroke and the rating is 45-50 horsepower, lubrication being by means of a McCord force-feed oiler, gear-driven. A compression release is fitted to facilitate starting. The general appearance of the car remains the same, a seven-passenger aluminum body being fitted; the weight, all on, is 2,800 pounds.

TRUCK PREPARED FOR THE START ON ITS LONG TRIP.

MITCHELL MOTOR TRUCK'S LONG TRIP.

A Mitchell motor truck is now engaged upon a trip from Chicago to New York, carrying a load of 3,000 pounds of freight. The trip is made wholly for the purpose of determining the reliability of the truck under such a strenuous program, and the economy of operation. The schedule does not call for an average of over 80 miles per day.

The motor truck is of the regular one-ton pattern, and the large overload of 50 per cent. above the regular rating is carried to prove that the efficiency of the rating is not exaggerated. Careful account will be kept of the amount of gasoline and lubricating oil used during the trip, and the result is confidently expected to demonstrate the practicability and the economy of this method of transportation. It is not expected that the truck will equal a railway train in the time consumed between terminal points, but it is believed that it will demonstrate that a load of merchandise may be hauled within a practicable time limit and at a minimum of cost.

The route to be followed lies along the lines of the Lake Shore and New York Central, and stops are scheduled at such cities as Toledo, Cleveland, Erie, Buffalo, Rochester, Syracuse, Utica, Albany and Poughkeepsie.

VYING WITH THE SIDE SHOW AT RURAL FAIRS.

At the Michigan State Fair a friction-driven Cartercar took a turn with the freaks in amusing the crowd of spectators, and while it was doing its stunt the pink lemonade, the South Sea Islanders, the snake charmer and all the other weird attractions, each with its barker howling his very loudest, had to take a back seat. Even the "gap of death," the "death defying demonstration of absolute desperation" and more to the same effect from the human megaphone and the posters had to fade by comparison with the man who did tricks with the automobile, for this was something new.

NEW HOME OF THE JONES SPEEDOMETER IN NEW YORK.

ANOTHER ADDITION TO AUTOMOBILE ROW.

New York's long and constantly increasing line of automobiling establishments that are daily going up further north along Broadway received a notable addition with the recent formal opening of the Jones Speedometer building at the corner of Seventy-sixth street and Broadway, in which ceremony the newspaper scribes duly assisted by punishing the buffet luncheon. The photograph illustrates the façade of the building, facing on Seventy-sixth street, as well as the end giving on Broadway, and it will be noted that the walls are largely composed of glass, while the building as a whole presents a pleasing exterior.

CORBIN BUSY ON NON-STOP DEMONSTRATION.

At 6 P. M. on Monday, September 9, a Model 8 24-horsepower air-cooled Corbin motor was cranked up at the Corbin Motor Vehicle Corporation's showrooms, 1892 Broadway, and left to run under public gaze. A week later, at 1 A. M., on Monday, the 16th, the car was run out of the garage with orders to reach Boston. Before going, however, its high gear was sealed in by E. V. Stratton, of the New York Automobile Trade Association.

PANORAMIC SCENE AT MICHIGAN STATE FAIR, WHERE THE CARTERCAR SEEMED TO BE THE POPULAR FEATURE.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

Work is being rushed on the new plant of the Chadwick Engineering Works. at Pottstown, Pa., and the company expects to have same in operation by November 1.

The Jackson Automobile Co., Jackson, Mich., has purchased the plant of the Jackson Vehicle Co., that city, and will use the buildings as a factory. The property has an assessed value of $115,000.

Walter Christie's circular track record of the mile in 52 seconds, made at Minneapolis, September 7, adds another to the list of Diamond wrapped tread tire achievements. All of Christie's racing for the past two years has been on these tires.

Changes has been made in the headquarters of the F. N. Motor Club of America, which will hereafter be located at 2234 Broadway, New York City, instead of at 2208 Broadway. Alfred G. Hanke has been elected treasurer and a director of the club, in place of F. V. Littlefield.

In the recent boulevard straightaway races at Wildwood, N. J., a stock Great Chadwick "Six" covered a mile in 52 seconds, which was a course record for gasoline cars. The Chadwick captured the touring car championship of the meet, and defeated a couple of Stanley steamers and several high-powered runabouts in another event.

King Edward VII of England has just ordered a fine pair of 10-inch Rushmore headlights for his new 60-horsepower English Daimler. The lights, which have just been shipped, are of the plain front type, nickel-plated and very handsomely finished. The Rushmore Dynamo Works has also shipped a pair of 9-inch Rushmore lights for Prince Louis of Battenburg.

The Knox Motor Truck Company, Springfield, Mass., has delivered three Model B 3-ton trucks to the Model Transfer Company, of Hackensack, N. J., and New York City. These trucks are run on regular daily trips between the metropolis and Ridgewood, N. J., for suburban deliveries, covering 50 miles per day, each doing the work of four double teams.

The manufacturing facilities of the B. L. M. Motor Car Company have been greatly increased by the acquisition of a building adjoining its present factory in Brooklyn, N. Y., which gives a total floor space of over 45,000 square feet. In addition, a building 60x100 feet is being erected in the rear of the present building, which will be used for assembling. It has been decided to limit the output of B. L. M. cars for 1908 to 250, despite the fact that the company's agents have already asked for a larger number than this.

The White Company announces that this year White steamers will be exhibited at the show of the Association of Licensed Automobile Manufacturers, to be held in the Madison Square Garden, November 2-9. The White Company, being entirely independent of and indifferent to the Selden patent situation, has always been in a position to go with either the licensed or unlicensed group. For the last two years the White steamers have been exhibited at the unlicensed show, but this year it has decided to exhibit with the licensed cars.

"On the Art of Cutting Metals," by Frederick W. Taylor, M.E., Sc.D., which was the presidential address presented at the last annual meeting of the American Society of Mechanical Engineers, has been printed and bound in cloth by the society, price $3.00. This or any other publication of the society may be had by addressing the secretary, 29 West Thirty-ninth street, New York. It is not necessary to send orders through members. None of the publications of the American Society of Mechanical Engineers are copyrighted.

Word has gone out to all of the representatives of the Thomas cars that hereafter cars made by the E. R. Thomas Detroit Company will be known as the Thomas Detroit instead of the Thomas Forty. The change is made, it is explained, primarily for the purpose of avoiding the confusion between the names Thomas Forty and Thomas Flyer that has been apparent during the past year. Both cars are distinctive in design and outline, and are made in separate plants—the Thomas Detroits in a new steel and concrete building in Jefferson avenue, Detroit, and the Flyers at Buffalo. The Detroit Thomas cars are, however, marketed by the E. R. Thomas Motor Company, of Buffalo.

The Aerocar Company, with factory and headquarters at Detroit, having been adjudicated bankrupt by the United States District Court, the Detroit Trust Company was appointed receiver, and on September 10 was unanimously elected trustee in bankruptcy for the concern. Realizing the importance of an early sale, so as to secure to the purchaser the 1908 business, which will soon be under way, the trustee has secured an order to sell the entire plant and property of the Aerocar Company at public auction September 24, either in parcels or in bulk. The inventory and appraisal of the plant amount to approximately $192,000, and the property consists of land and buildings, conveniently situated on railroad, and full lines of machinery, tools and appliances; a large stock and partly manufactured product and some complete machines; a large amount of automobile parts, patterns, patents and trade marks, and accounts receivable.

RECENT BUSINESS CHANGES.

With a view of securing more convenient and commodious sales quarters, the New York branch of R. M. Owen & Company has leased the property at 1759 Broadway, which was formerly occupied by Smith & Mabley. The Owen Company will move from its present quarters on or before October 1.

The Harry S. Houpt Co., the well-known Eastern representatives of the Thomas line, with headquarters in New York City, has succeeded the Autovehicle Company, of Newark, N. J., as representatives of the Thomas line in New Jersey. The Newark salesrooms will be maintained at the old address, with George T. Cole as resident manager.

President Bailey, of the York Motor Car Company, of York, Pa., has decided that the growth of the company's business in Philadelphia has warranted the establishment of a branch house to succeed the Pullman agency, which has been in existence for about a year at 205 North Broad street. The new deal goes into effect at once, the branch occupying the old agency quarters.

A. M. Spear, Jr., has resigned his position as manager for the business of J. A. Dowling, Portland, Me., and will start for himself in the automobile business in that city. Mr. Spear has leased a salesroom on Exchange Street, has secured the agency for a fine line of cars and expects to be in readiness to receive customers by October 1.

PERSONAL TRADE MENTION.

Frank C. Thomas, for some time press representative of the Cadillac Company and later of the Pope Companies, is to be the automobile editor of the new Boston *Tribune*. An up-to-date department is to be conducted.

John R. Bensley has been appointed manager of the commercial vehicle department of Fairbanks, Morse & Company, Chicago. Mr. Bensley has been identified with the auto trade in Chicago for some years, and brings an extended experience with him.

The Hills Motor Car Company, Royal Tourist agents in Philadelphia, has been strengthening its selling force. Last week it added to its list of salesmen Robert W. Blake, former manager of the Knox branch, and W. C. Middleton, who has been connected with the Titman & Leeds Company, Matheson and Studebaker agents.

NEW TRADE PUBLICATIONS.

A booklet of great typographical beauty, which may rank as one of the most comprehensive publications on the 1907 Gidden Tour, has been issued by R. M. Owen & Company, the general sales agents of the Reo car, whose executive offices are in New York and factory at Lansing, Mich. Among the good features is a series of clear and accurate maps showing the route of the 1907 Glidden Tour, the towns passed through in each of the seven States, and the principal towns covered in the 500-mile official non-stop run of the 16-horsepower Reo No. 33, from New York to the Jamestown Exposition, after finishing the Glidden Tour with a perfect score. The booklet will be interesting to all automobilists, and particularly useful to those who contemplate visiting Jamestown before the close of the summer touring season.

The wording of the title page of the latest Stevens-Duryea publication, "A catalogue of the Stevens-Duryea automobiles, with especial reference to the six-cylinder cars," does not do justice to the work of the compiler and printer. Elegantly bound within stout boards, printed in black and colors on high-grade paper, illustrated with line drawings, half-tones and full-page color prints, the book is far above the ordinary range of trade catalogues. The subject matter, too, is of a nature to interest and instruct all who are interested in automobiles, diagrams and concisely written text telling in a logical manner the story of the Stevens. The usual specifications are given, but do not occupy the major part of the book. A further quarto publication from the Chicopee Falls, Mass., factory deals pictorially with Stevens-Duryea limousines. A series of handsome half-tones are mounted on hand-made paper, given just sufficient text to make them explicit, and bound in a green cover. They form an excellent presentation of the firm's line of elegant limousines.